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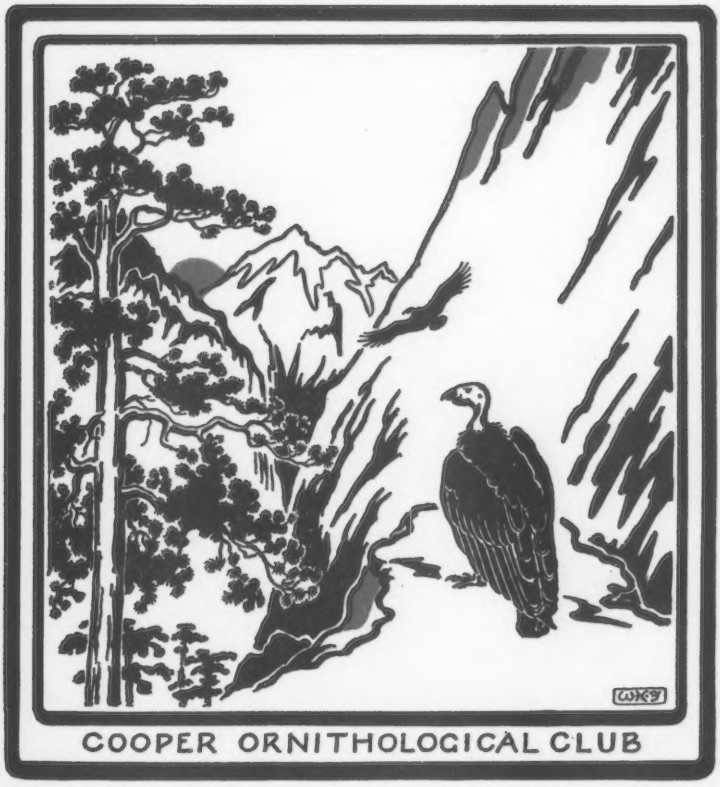
THE CONDOR

A Magazine of Western Ornithology

Volume 44 May-June, 1942 Number 3



COOPER ORNITHOLOGICAL CLUB

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A Magazine of Western Ornithology

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May 20

THE CONDOR

VOLUME 44 MAY-JUNE, 1942 NUMBER 3

DISPLAY AND SEXUAL BEHAVIOR OF THE BRANDT CORMORANT

By LAIDLAW WILLIAMS

Descriptions of the display and sexual behavior of the Brandt Cormorant (*Phalacrocorax penicillatus*) have been extremely meager. Townsend (1925) noted certain posturings of this species but did not mention what I have called "advertising display," an essential feature of sexual behavior. Hoffmann (1927:20), in his manual, aptly describes in one sentence a certain part of the advertising display, and Michael (1935) describes some display actions seen in southern California.

The present study was carried on at certain breeding colonies along the coasts of Marin, Monterey, and San Diego counties, California. The work was done principally at Point Reyes, Marin County, and "Bird Rock" near Pacific Grove, Monterey County. About three hundred hours were spent afield over a period of eight years from 1933 through 1940.

All these colonies except the one at La Jolla, San Diego County, are on small, rocky islets close to the mainland. No landings were made. High seas rendered this impossible during most of the breeding season. For the same reason, and because most of the work was done on reserves, no birds were collected. Collection of displaying birds, if practical, would have facilitated identification of sex. However, it was found possible to make identification in other ways. Banding or marking adult birds by other means would also have been impractical.

Observations were made from the mainland with the aid of a telescope that magnified about 40 diameters. Although this had certain disadvantages, important advantages were gained. The birds were entirely undisturbed. Landing on small rocks where there are colonies flushes the incubating cormorants from the nests, exposing the eggs to the ever-watchful and bolder Western Gull (*Larus occidentalis*). Moreover, even if the exposed eggs were not robbed, the value of observations made at such times is questionable. My records show that under normal conditions the eggs are never left unattended. At the Point Reyes colony it was possible to approach within a few hundred feet without disturbing the birds at all, and from the elevation of the cliff there was an unobstructed view down into the nests (fig. 24).

Certain birds could be individually identified by means of a missing rectrix, asymemetry of head plumes, or unusually pale buff on the throat. This was not entirely satisfactory. The individual rectrices, which are easily observed when the tail is cocked in advertising display, can seldom be seen during the later stages of the cycle when the bird no longer indulges in frequent display. The plumes wear down in the course of the season and therefore are not a reliable mark for long.

Bent (1922:266) says, "Brandt cormorants seem to prefer to nest on the flat top of a rocky island, on a gradually sloping incline or more often still on a high rounding shoulder of rock." The exception to this rule is the colony at La Jolla where the birds nest on a cliff face (fig. 25). But even here the sites chosen are wide ledges or niches and are not nearly as precarious as the recesses generally chosen by the Pelagic Cormorant (*Phalacrocorax pelagicus*).

The plumes and the gular pouch.—Bent (1922:269) states that "the partial pre-

Fig. 24. Part of the colony of Brandt Cormorants and Murres at Point Reyes, Marin County, California; June 8, 1935.

nuptial molt of adults, at which the long nuptial plumes of the neck and back are acquired, occurs in February and March . . . ." I found, however, that on the Monterey Peninsula these filaments become easily visible in early December. Weekly observations of adults in November and December over a period of eight years, made under standard conditions, bear this out. By July the plumes have become mere stumps, or have almost entirely disappeared, presumably through wear.

During the non-breeding season the gular pouch is a dull, blue-gray. At about the same time, or a little after the time that the filaments appear, it takes on a most brilliant cerulean blue. This color in turn is replaced for the most part by dull blue-gray in July.

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Fig. 25. The Brandt Cormorant colony at La Jolla, San Diego County; March 23, 1938.

The sexual cycle.—The period of sexual activity roughly coincides with the aforementioned anatomical changes, although some abortive display which might be interpreted as sexual may be seen even in the non-breeding season. At Bird Rock intense sexual activity begins in January and continues into June. I have little data on the egg-laying period at this colony because the eggs are hidden from an observer by the walls of the nests. But this long protracted courtship season is reflected in the fact that small downy young may be seen there regularly for three months, from May through July.

The sexual cycle may be divided into three phases. These are not to be considered as necessarily following a time sequence, but are distinct divisions of behavior throughout the cycle.

Phase I, advertising display by males and "visiting" by females.

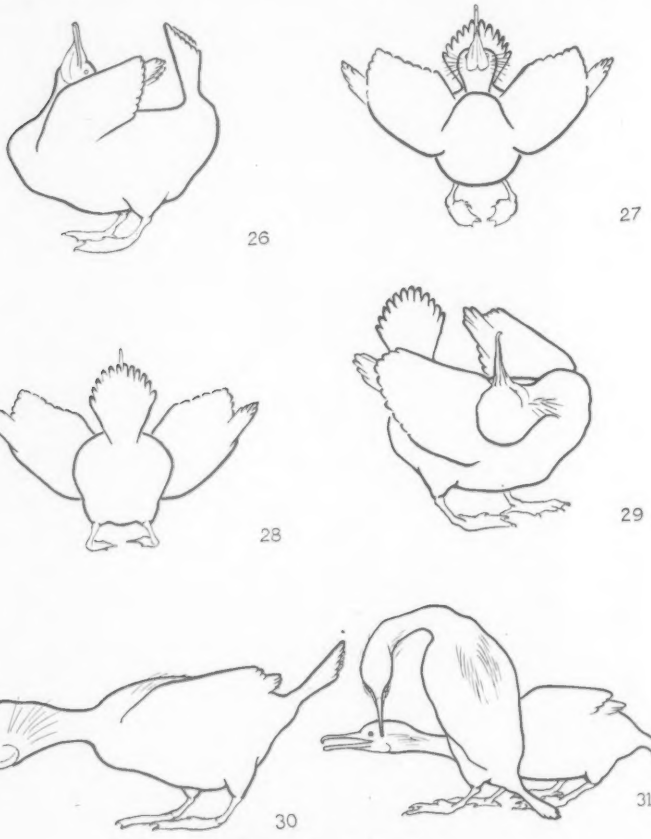
Phase II, pairing up, temporary or permanent, accompanied by mutual displays.

Phase III, incubation of eggs and rearing of young, with gradual diminishing of all the displays.

In phase I the male takes up a station on the rock. This station becomes the center of a future limited but definite territory, although there is evidence of some shifting about at first. To this place the nesting material is brought by the male even though he has not yet acquired a mate.

The displays and associated behavior.—The "advertising display" has two parts. The first of these may be called the "flutter." The bird squats, the breast almost, or actually, touching the rock. The neck is drawn back, the nape resting, or nearly resting, on the back, the bill pointed upward. The tail is cocked and spread. The feathers of the head and neck, together with the white filamentous plumes of that region, are decidedly ruffed out, giving a swollen effect (figs. 26 and 27). The longer back plumes are only very slightly elevated from the back. Neither the plumes of the head or back are nearly as showy as the head plumes of the Night Heron (*Nycticorax nycticorax*), or the long, voluminous and highly erectile plumes of the Snowy Egret (*Egretta thula*). Much display has been observed in individuals of *penicillatus* whose plumes have either been considerably worn or have not yet attained maximum length. In the flutter the gular

pouch bulges. As in other displays of the species this distention is achieved by expansion and depression of the hyoid apparatus. At close range it is possible to see the skin protruded at certain places by this action of the hyoid. The distended skin then exhibits



Figs. 26-31. Postures of Brandt Cormorants.
26. Advertising display; the flutter, side view.
27. Front view of the flutter.
28. Rear view of the flutter.
29. The flutter, with head twisted to one side.
30. Advertising display; the stroke.
31. Precoitional postures; intense type.

the most brilliant cerulean hue. It may aptly be described as suddenly blossoming forth into this color and thus forming what is perhaps the most striking feature of the display, as seen through human eyes at least. The brilliant color, however, is missing along certain longitudinal lines on the pouch; the longest and most noticeable of these are indicated in the drawings.

As the bird assumes this squat and ruffed out position of the first part of the advertising display, the wings are lifted slightly off the back and rhythmically fluttered.

This is accomplished by raising the humerus up and out from the back. The radius and ulna remain in the folded position and there is no actual spreading of the primaries, the manus being held against the side. Even though the primaries are not spread, they are so oscillated behind the secondaries during the flutter that, from the rear, they suggest a feather duster in motion (fig. 28). There is movement of the slightly erected back plumes during the flutter but in the drawings they are masked by the flight feathers. A rather frequently observed variant to the usual flutter is with the head twisted to one side (fig. 29).

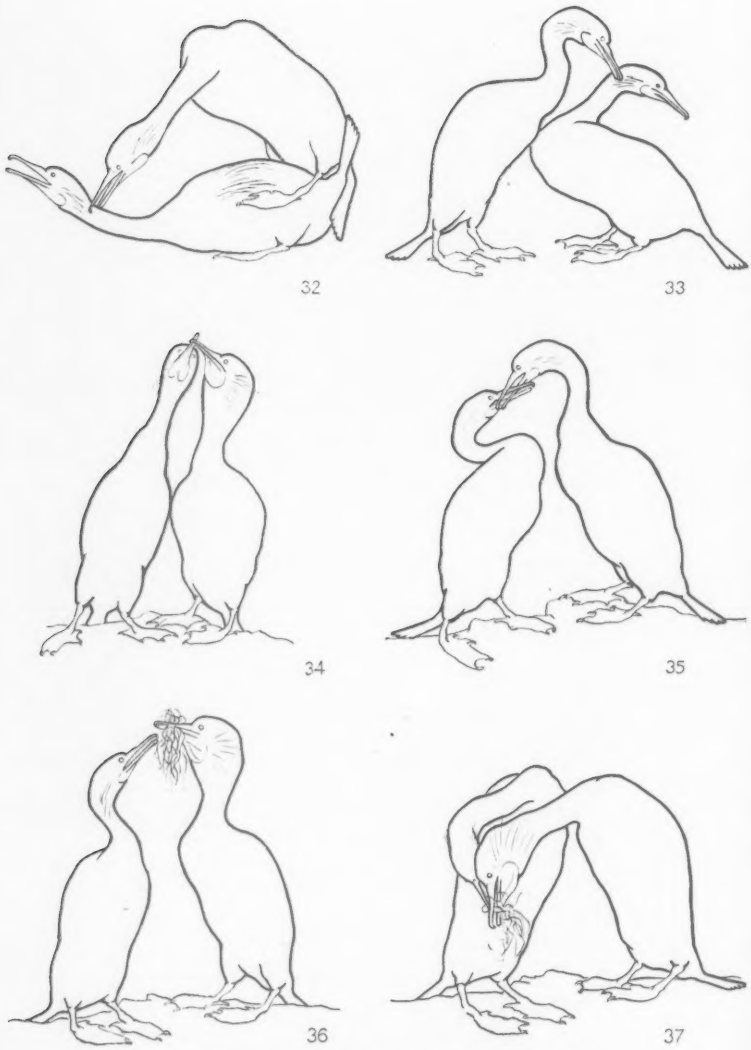
The flutter may be done for as long as twenty-five seconds before the second part of this display, the "stroke," is made. In the stroke the wings are partly replaced on the back; the head is thrust forward and downward in a hammer-like stroke; the bill, which at the end of the stroke almost, if not actually, touches the rock, is opened a bit; the gular pouch remains distended and the head and neck feathers, with the filaments, remain ruffed out (fig. 30). After a slight pause in this position, the head and neck are recoiled and the thrust is repeated. As many as fifteen strokes may be performed before the bird reverts to the flutter. More frequently just a few strokes are followed by a pause and then a flutter, and thus the display is repeated for an indefinite time.

While a male is advertising, various females come to him. I have called this "visiting." The females move about among the advertising males with thin, up-stretched necks, peering at one advertiser and then another and exhibiting a tentative air as they move hesitantly among the crowd of swollen-necked, fluttering, and stroking males. As the female approaches a group of males, there is a sudden increase in display activity, quiet males recommencing display and those already engaged in advertising intensifying their activity. As soon as a female reaches a male, either by a short flight or by walking, the two birds may be considered to have passed into phase II, whether the female remains for long or not.

In phase II a number of bisexual displays are exhibited. Included are displays or posturings performed by both sexes, whether they are done synchronously or individually; the birds of the pair may even be temporarily alone. If pairing up is not accomplished and the female leaves, the male usually resumes advertising display and the female usually goes to other advertisers; the birds may be said to have reverted to phase I. The male does not advertise when the female is with him.

As the female approaches the male, the strokes of his advertising display merge into the prone (horizontal head and neck) position of the "lower precoitional posture." The feathers of the head and neck are relaxed or even compressed to such an extent that the neck looks thinner than normal. The female at the same time assumes the "upper precoitional posture," intermittently jabbing with her bill at the male's head or nape (fig. 31). The male, from time to time, slightly recoils the head and then stretches it forth again, an action somewhat reminiscent of the strokes of advertising display. The female may even *mount* at this point and behave very similarly to a male performing this act (fig. 32). But more often the female goes no further than is shown by the bird on the left in figure 33, while the male may rise to a partially erect posture. The female may then leave to go to another advertiser. Or the male may assume the upper precoitional posture to which the female may or may not respond by taking the lower. If she does, the male may immediately mount. Thus there are instances of an almost immediate reverse mounting, although generally the male does not mount until sometime later. The upper and lower precoitional postures may be assumed by *either* sex and *mountings* may even be done by either sex. However, my observations indicate that actual cloacal contact is made only when the birds are in the position usual to most species, that is, with the male uppermost.

When the mounting bird gets off, both birds stretch up, one ruffing out, its gular



Figs. 32-37. Actions involving both members of the pair.
32. Mounting.
33. Precoitional postures; mild type.
34. The "stretch and ruff."
35. Billing.
36. Nest-material ceremony; arrival.
37. Placing the material.

pouch distended; the bills of the pair almost touch. I have called this the "stretch and ruff" (figs. 34 and 38).

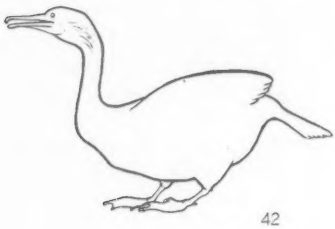
A period of "billing" often follows. They nibble and grip each other's bill, and twist and sway together (fig. 35). This generally leads to rubbing the sides of the heads together, nudging the body, nudging the nape, and sometimes actually ruffing the feathers. An important feature at this stage is the nibbling by one bird at the other's gular pouch.

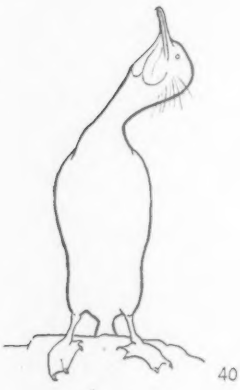
The male bird goes after nesting material if the female remains for any length of time. This almost invariably follows copulation with the male uppermost, and often

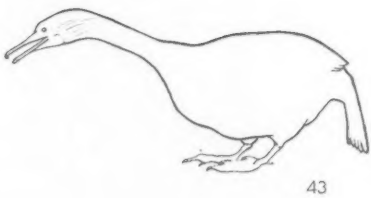
Fig. 38. The "stretch and ruff" (topmost pair); La Jolla, March 23, 1938.

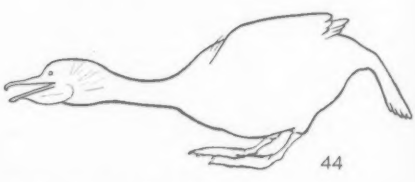
it occurs when this has not yet been effected. As he returns to the station where he has left the female, the male alights with head high, gular pouch inflated, head and neck plumes and feathers erected, and back plumes slightly raised. The female rises from a squatting or lying position to take hold of the material in his bill. They sway from side to side, both holding the material, then arch down stiffly together and deliberately place it on the nest. Sometimes the female merely follows the male's head with hers as he places the material and there is no sway. This display I have called the "nest material ceremony" (figs. 36 and 37). A male in phase I may do what is essentially his part of this ceremony even though there is no female present to receive the material.

The "hop" is a display used in all three phases, although it is decidedly less frequent in the third. It has also been observed on perching rocks in the non-breeding season. The standing bird bows low, bending its neck stiffly down in front of it until the bill almost touches the rock between its webbed toes. In this bowed position it hops directly up, leaving the rock an inch or two. As the toes touch the rock again, the head and neck are swung upward until the bill is almost vertical. At the same time the









Figs. 39-44. Hopping and threatening activities.
39. The hop; bowing.
40. The hop; inclining head after the bow.
41. Landing with a hop.
42. Threat gesture; beginning of fly-casting motion.
43. Later phase of fly-casting motion.
44. Climax of fly-casting motion; this position also used as a direct threat.

feathers and plumes of the head and neck are ruffed out and the gular pouch is distended. The neck is slowly and stiffly inclined a bit to one side (figs. 39 and 40), the bird holding this pose for about a second. Sometimes the bird performs the latter part of this display as it alights upon the rock from a flight (fig. 41). The hop is performed

by either bird in the course of display activities in phase II. Often a male going to another part of the rock to pick up unguarded nesting material lands with a hop; or he does this as he alights at his station either when it is empty or occupied by a usurper which he drives off. Sometimes when a female flies to an advertiser she lands with a hop. In the non-breeding season the hop, or landing with a hop, is associated with driving another bird from a perch.

Threat or intimidation displays used by both sexes occur during all phases of the sexual cycle as well as in the non-breeding period. They are of two types: the "threat gesture" and the "peck threat." In the threat gesture the neck is thrust forth, usually low along the rock and toward the object threatened. The head and neck feathers and plumes are ruffed out, the wings are slightly lifted off the back, the gular pouch is distended with the hyoid protrusion showing slightly more anteriorly than in other displays, and the bill is partly open. In this position the head is rapidly twisted on the axis of the neck, describing a short arc to right and left, while a loud, hoarse, trilling growl, or gargling sound, is uttered. Sometimes the head is thrust directly at the threatened object (fig. 44); sometimes it is thrown with a sort of fly-casting motion (figs. 42, 43 and 44). The peck threat is nothing more than an extremely rapid peck, or series of pecks, toward the threatened object. Occasionally a peck threat is used by a male against a female with whom he had been engaged in mutual displays in phase II, whereupon the female precipitately leaves.

A threatened male often replies in kind and the birds may grip bills. Unlike many land birds whose threat is so often mere bluff, Brandt Cormorants engage in genuine fights in which rival males push and pull each other, flap their wings about wildly and tumble over the rock. On such occasions the female of one of them, or the neighbors, or all, may add a few pecks, too. One fight that was timed lasted for three minutes.

Threat displays have been seen directed toward Western Gulls, sea lions (*Eumetopias jubata* and possibly *Zalophus californianus*), and Murres (*Uria aalge*). The threat gesture was used on many occasions by pairs on nests against gulls hovering over them. Large downy young with flight feathers protruding through the sheaths have been seen using the threat gesture toward a Western Gull which passed by their nest (Monterey County, July 3, 1940). The distance was too great to detect any sound that might have accompanied this action. Cormorants not on nests seem to give way before a sea lion advancing up the rock. But on several occasions birds on nests have been seen to use the threat gesture against an advancing sea lion which halted. At Point Reyes both the peck threat and the threat gesture have been observed to be directed against murres. A murre passing through a group of cormorants is pecked and threat-gestured from all sides. One male cormorant was more vicious toward a neighboring incubating murre when a female was with him than when he was alone. He once grabbed the murre and shook its whole body as a dog shakes a rat (Point Reyes, May 18 and 19, 1939). But the cormorant-murre relationship may not be entirely to the detriment of the murres. A downy young murre was so close to a cormorant on a nest with eggs that it could peck the tail of the cormorant (Point Reyes, June 23, 1939). During the years of observations at Point Reyes the murre numbers have kept up and the cormorant numbers, for some reason, have declined a little.

There are no displays peculiar to phase III (incubating and rearing of young) except the one of "nest relief." But as noted above, all of the displays carry over into this phase, though they diminish as the sexual cycle nears completion. Several minutes often elapse during nest relief. The relieving bird nudges the breast of the incubating bird or rubs its head on the sides of the latter's breast. This is interspersed with billing and self-preening. After some minutes the exchange is made, one bird often seeming to push the other off. The bird assuming incubation then pulls and tugs at the nesting

material and turns the eggs. This ceremony seems to be similar to those described for many other species. A male has been seen advertising from an incubating position while sitting on one egg. After nest relief this male mounted the female on the nest as she took her turn at incubation (Point Reyes, May 7, 1940).

Call notes.—Because of the constant sound of surf beating on the rocks, my data on call notes are meager. Except in the threat gesture, when the correlation of voice and action is easy to note, it has been almost impossible to associate a sound heard from the crowded rock with a particular display.

Calls are of two types: (1) a variable, low, hoarse, guttural, prolonged croak or growl or gargle, and (2) a high, clear, incisive *kauk* uttered in a series of three or more at regular measured intervals of about a second. The first varies from a pig-like grunt (also noted by Hoffmann, 1927:21) to sounds that have at times suggested to me certain notes of the Raven (*Corvus corax*). The second is louder and frequently carries across the open water and surf when no other call note does. The sound made during the threat gesture is of the first type and the gargling quality is perhaps due to the rapid twisting of the neck.

Both types of call have been heard at perching places at other than nesting time. Type one has been associated with disputes over perches. The *kauk* has been heard from a swimming bird. It also was definitely associated with a territorial dispute in one instance. On this occasion two advertisers at adjoining stations peck-threatened each other vigorously, once or twice gripping bills. When they finally broke away, one bird, in a squat position with pouch distended, thrust its head a little forward several times. At each thrust the gular pouch was further distended and the "hyoid angle" moved anteriorly, as in threat gesture, and at the same time the *kauk* was heard (Bird Rock, March 18, 1940). Nestlings utter rhythmic peepings. In a large colony they can be easily heard from some distance on calm days, no doubt due to the combined effect of many voices.

Nesting material.—Nesting material is gathered in four ways: (1) The birds go about on the rock picking up dry material that either comes from abandoned nests or has blown from the edges of other nests. (2) They thieve material from a neighbor's nest, occasionally even in the presence of a bird on that nest, although generally in the absence of an unmated bird that has gone to get more material. Nesting material at a station is vigorously defended by threat displays. An unmated male never acquires much material because it is thieved in his absence. For example, Advertiser "P" was watched during two days as he alternated his display with bringing nesting material to his station. Bird "Pi", the male of a neighboring pair with two eggs, made a quick flight to P's station each time P left and thieved the material, so that P's nest made no progress during the two days (Point Reyes, May 16 and 17, 1939). There is continual pilfering of nesting material from neighbors in colonies of *Phalacrocorax auritus* (Lewis, 1929:31-33). When a female is present, however, she will defend the material from potential thieves by threat displays. (3) Cormorants sometimes gather land plants for the nest. The Farallon weed (*Baeria maritima*) has been found in nests on the Farallon Islands (Ray, 1934:79). Large beakfuls of land plants are carried from the edge of a cliff on the landward side of an islet at Point Lobos, Monterey County, to the nesting colony on a rock on the seaward side of the same islet. Chapman (1908:272) also noted this behavior at the same place when he visited California in 1903. (4) The principal method of gathering material is by diving for marine plants growing beneath the water. This is done particularly at certain places, or gathering grounds, near the colony. At Bird Rock, for instance, in the height of the season numbers of birds can be seen resting on the water in a restricted area near the mainland, either preparing to dive or pausing with material in their bills before flying back to the colony (fig. 45). Five

Fig. 45. Brandt Cormorant carrying nesting material from sub-marine gathering ground Bird Rock, near Pacific Grove, Monterey County, April 29, 1939.

counts of the time spent under water to gather the plants near Bird Rock averaged 23.4 seconds. Five counts made at Point Lobos averaged 25.2 seconds. Red and brown algae are gathered. The most important marine plant, however, is *Phyllospadix*, a plant resembling eel grass.

The male, almost exclusively, gathers the nesting material even when the birds are paired up. Females have been seen on a few occasions picking up dry material on the rock and bringing it to the nest. Both sexes arrange it at the nest. The nest is shaped in two ways: material is picked up from the outer side of the nest and laid on the rim; and birds lying in the nest tug violently at the packed material in the bottom of the nest, loosening it and laying it on the rim with gentle shakings. This tugging is a conspicuous action when one bird is alone on a large pile of nesting material. Nest building starts with the gathering of material by the male in phase I, reaches its highest development when the female remains with the male in phase II (the nest progresses rapidly at this stage because the female is there to guard it while the male goes for more material), and continues into phase III. Material was brought to a nest with young at a small colony (Monterey County) on July 2, 1940. A medium sized downy young bird has been seen reaching over the edge of the nest to drag up material and lay it on the rim (Bird Rock, July 27, 1939). Kortlandt (1940:434) observed a "quivering movement with twigs" in the young of *Phalacrocorax carbo* when two weeks old, and he says that at the age of about 4 to 5 weeks they pick up twigs and bind them into the nest.

Territory.—It is my opinion that the Brandt Cormorant, a colonial nesting bird, has a small but definite territory. Males proclaim this territory by advertising display, which has a positive effect on females. They also defend by threats and fights a few square feet around the station where they do this display. This area fulfills the concept of a territory because the male makes himself conspicuous there; the females come there; copulation and pairing-up occur there; the nest is built there; and the male is intolerant of other males at this place. Although this territory seems very small, the minimum between nest centers being about four feet, I believe that it has biological importance to the species and that it is a genuine territory, forming a unit of organization within the colony. Mayr (1935:31) defines territory as "an area occupied by one male of a species which it defends against intrusions of other males of the same species and in which it makes itself conspicuous." Tinbergen (1939:69) says, "whenever sexual fighting is confined to a restricted area, this area is a territory." (Also, compare Howard, 1920:198-200, and Tinbergen, 1936:6.)

EXAMPLES OF BEHAVIOR SELECTED FROM FIELD NOTES

Establishing territory.—Bird Rock, April 14, 1939. A known advertiser was sitting at a station. Another bird landed with nesting material in its bill close beside this bird. The newcomer, as it landed, with the material still in its bill, peck-threatened the advertiser, forcing it to move off about four feet where it commenced the advertising display. The newcomer immediately put down the material and began to advertise also.

Male advertising and females visiting.—Bird Rock, 1939, bird "MR."

February 18. Bird MR with an identifiable gap in tail noted at a particular station.

February 20. MR is at the same station. He is one of a group of seven advertisers. 9:18 a.m.; MR goes to the gathering grounds and brings back fresh marine plants to his station. 9:32; goes a short distance and picks up dry material from the rock. He lays it down at his station with the nest material ceremony, although there is no female there. 9:35; advertises. 9:40; leaves the rock, apparently to go fishing. 10:15; returns. 10:28; steals the material of a neighbor that had just left its station. 11:32; a female comes to the group of advertisers. Four of these advertise violently. The female goes off toward another group.

February 23. 8:22 a.m.; a female comes to MR as he advertises. He assumes the lower precoitional posture, the female the upper. 8:26; the female mounts. There is no coition. They stretch and ruff. MR hops. Soon the female leaves. 8:27; MR threat-gestures a cormorant passing rapidly by. 8:28; MR merges the stroke into the lower precoitional posture as another bird approaches. They bill. MR again takes the lower posture. The female moves off to another advertiser. A third female comes and the same sort of actions follow.

In the course of the morning MR leaves his station to go for nesting material. While he is absent the material left at the station is stolen. During a second absence more material is stolen.

Female visiting advertising males.—Female B on Bird Rock was watched continuously from 9:12 a.m. until 12:23 p.m. on March 18, 1940. She made five rounds of visits to advertising males. Between the rounds she rested, preening and sleeping, at places away from the groups of advertising males. Twice she did this at the same spot—a small pinnacle of rock—twice at other places.

The first round took 18½ minutes, the second 8 minutes, the third 18, and on the fourth she was watched for 8 minutes before she was lost in the crowd of advertisers.

The advertisers of round II were different from those of round I. The groups on other rounds may or may not have been the same or may have overlapped.

Round I. She went to eight different birds, returning once to one of these. Three of them were advertising at the moment of her arrival.

Round II. She went to five males. Four of these were advertising at the time.

Round III. She went to four males. When she was with one bird, after she had taken the upper precoitional posture and the male the lower, B hopped and nudged the male's nape. B was unusually vigorous with this male. Then the male hopped and they billed. The male's billing turned into a peck threat and B left precipitately.

Round IV. B went to two birds and then her identity was lost.

The reactions of all of these advertisers were the same; they gradually merged the stroke into the lower precoitional posture as she approached and then assumed the full lower posture when she reached them.

Sometimes B merely stopped beside the male, but more often she took at least one jab at the nape of the male from the upper precoitional posture before looking about and leaving for the next bird.

Advertising males and a visiting female in which pairing-up seems to have been effected.—Point Reyes, May 19 and 20, 1939. A group of advertisers, numbers 1-4, some with scraps of nesting material, some without, was watched continuously (fig. 46). There was a certain amount of fluidity in these stations, except No. 3. The No. 1 bird had a tendency to go a short distance away and advertise there for a few minutes and then return to his station, landing with a hop. No. 2, likewise, advertised from another place occasionally. As the observations started, 1, 2, and 3 were extremely vigorous in their advertising.

May 19. 11:32 a.m.; a female (individually identified by the length and number of plumes on the sides of her head; known as female No. 3) landed in the quadrangle and went to No. 3, taking the upper posture while the male took the lower. Presently she went to 2, and then back to 3. While she was with 3 the other birds advertised vigorously, making the strokes in her direction. Then she went to 2. Her upper posture was carried to the point of putting one foot on the male's back, but she did not actually mount. She then went back to 3 but soon to another bird outside the quadrangle. As she went to this other bird, 1, 2, and 3 advertised.

After she had returned to 3 for the fifth time the precoitional posturing was most marked, but the male got up from the lower posture and they billed. The male then hopped and they arranged nesting material together; then female No. 3 took the lower precoitional posture and the male imme-

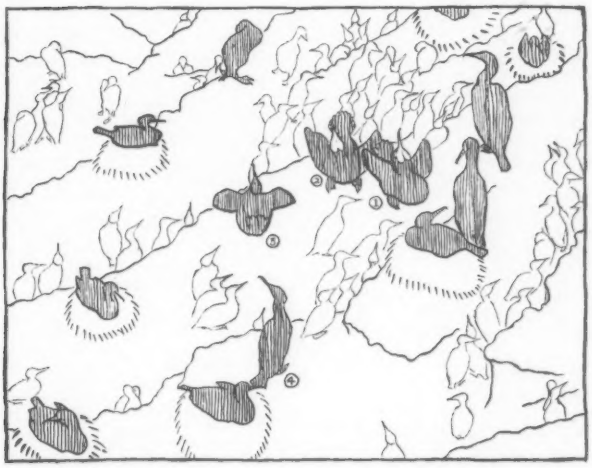


Fig. 46. Advertisers numbers 1-4 at their stations at Point Reyes colony, May 19, 1939 (drawn from a photograph). Numbers 1, 2, and 3 are fluttering. Murres shown in outline.

diately mounted. Insemination seemed probable. Almost immediately after this mounting the male went for nesting material. During the next two hours there were four more mountings with the male uppermost. These were distributed among thirteen trips by the male to get nesting material from under water. The observations for the day closed at 2:45 p.m. with both birds sitting quietly at the station.

May 20. The male was first seen alone at station 3, then female No. 3 was alone there. 11:27 a.m.; both birds were at the station. 11:54; female No. 3 went to another advertiser and performed mutual displays with it. Then she returned to No. 3, landing with a hop, followed by the usual precoitional postures. The bird with which she had just been, started to advertise, whereupon the female looked around at it and went back to this bird. During this action No. 1 advertised but *No. 3 did not.* (In fact after the first mounting on the previous day male No. 3 was never seen to advertise.) After a moment spent with this other bird the female flew back to 3 who was not advertising, although 1 was; she landed with a hop. They took the usual precoitional postures and then both had a peck threatening bout with 4. Female No. 3 made another trip to the same bird she had visited twice before that day and to two other birds, all of them advertising as she went to them. With them she performed mutual displays with varying degrees of intensity but no mountings occurred.

12:24 p.m.; the female returned to 3. 12:32; No. 3 male mounted but copulation was not effected because the male, while still on the female's back, locked bills with No. 2 who pulled him off. 12:42; No. 3 female left the rock, apparently to feed. 12:54; No. 3 female returned. After 22 minutes of preening and mutual displays the male made two trips for nesting material and then mounted the female.

Observations ended with the female lying on a large pile of nesting material that had been accumulated. During the period of observation male No. 3 had threatened neighboring males, stolen their material, and threatened near-by murres.

To summarize: Female No. 3 went from one advertiser to another, taking the upper precoitional posture each time and even putting her foot on the back of one male. But she kept returning to male No. 3, with whom, it appeared, she eventually paired. This male's advertising stopped when he apparently became paired up. The male went to get nesting material immediately after copulation had taken place. Other copulations followed, always with the male uppermost. The female seemed inclined to "go the rounds" even after pairing up, but she always returned to No. 3. Except for the one abortive mounting (putting her foot on the back of No. 2) at the beginning of the first day's observations, female No. 3 did not mount any bird. Station No. 3 was never left unattended in the course of the observations.

The male defending his territory against intruding males.—Point Reyes, May 17 and 18, 1939, pair "G." This was a pair that had a formed nest but which had no eggs. They frequently copulated,

with the male in the upper position. An unmated male had his station two neck-lengths away. In the absence of male G, "Neighbor," the unmated male, walked over to the female and copulated with her. (This was the only male I ever observed going *to* a female.) On the return of male G, a severe fight ensued resulting in Neighbor retreating to his station where he performed the advertising display. Neighbor later attempted to present female G with nesting material while male G was present. This also resulted in a severe fight, with Neighbor retreating to his station and advertising. When pair G were together at their nest, they threatened Neighbor, acting as a team. When female G went visiting other males (she performed mutual displays with them but no mounting was noted) neither male G nor Neighbor showed any interest and they remained at their stations.

COMPARISON WITH OTHER SPECIES OF PHALACROCORAX

Nature of display.—I am aware of no extensive published works on the display and sexual behavior of species in the genus *Phalacrocorax* other than those concerned with *carbo, auritus,* and *aristotelius. Carbo* has been the most studied.

Carbo, as observed in Holland by Haverschmidt (1933) and Kortlandt (1938, 1940), nests both in trees and on the ground, far more congenial places for study than the inaccessible rocks of the Pacific, the home of *penicillatus.* Haverschmidt and Kortlandt had the great advantage of working with color-banded birds. Lewis (1929) describes *auritus* nesting in trees, on bare rock and on the ledges of cliffs. When this species nests on the ground, the distance between nest centers varies, but often it is "about four feet" (*op. cit.*: 32). This is comparable to the distance between nests in *penicillatus.*

Kortlandt and Lewis mention sticks used in the construction of the nest. The latter mentions also various land plants as well as marine plants obtained by diving. No sticks are used by *penicillatus* in the colonies I have studied, nor was any tree nesting observed, there being no trees present.

Mendall (1936:39) describes "water courtship" in *auritus* and says that he has seen mounting take place while the birds were in the water. I have never seen aquatic mounting, but on one occasion (Bird Rock, July 27, 1939) I saw actions which might suggest elements of his description of water courtship.

Carbo and *auritus* perform a flutter of a similar nature and from much the same posture as the flutter of the advertising display described for *penicillatus.* Kortlandt calls this "wing-flapping" (*Flügelklappen*). Lewis (1929:23-24) says, "the wings [of *auritus*] are slightly raised from the sides so that they lie in approximately the same plane as the back . . . . and the manus with its primary feathers is jerked quickly forward and outward, only to fall back into place almost immediately and jerk again . . . ." *Aristotelius* starts the display from a similar posture but there is no wing movement (Selous, 1901:166 and 1927:59). All four species cock their tails.

Important accessories to the display of *carbo* are the spot of bare orange colored skin beneath and posterior to the eye and the white patches of the head and flanks. The flank patches are especially revealed as the wings are flapped. Selous (1927:58) mentions the gaping of *aristotelius* which reveals the "brilliant gamboge" interior of the mouth. Apparently the orange gular pouch of *auritus* functions in the display of that species, although Lewis makes no reference to it as having a particularly striking quality. Townsend (1925:93) makes special mention of the blue of the gular pouch of *penicillatus* saying that it "would flash out with great brilliancy," and that "there was every appearance of the inflation or pushing out of the gular pouch during the display." He says further that "in one case, seen in good light, the gular pouch during the display appeared to lie in longitudinal folds. In this case the mouth was slightly open and vibrating, and the vibrations were communicated to the gular pouch and to the white plumes standing out from the sides of the neck." No doubt these vibrations refer to the well known palpitations of Pelecaniformes which may serve the various species as a cooling device. Lewis (1929:34), on the other hand, does not believe that such is always

the purpose of these quiverings in *auritus*. In the Brandt Cormorant, at least, there is no indication that they have any relation to display. Kortlandt (1940:408) says of *carbo*: "In warm weather one often sees the 'throat-pouch-fanning' . . . whereby the throat-pouch shakes and, by this means, the pharynx forces out warm exhalations" (translation). Michael (1935:37) compares the distention of the *penicillatus* pouch to the "puffing out" of the throat of *Sceloporus* lizards. However, I am not sure that the tone of blue is the same, if Michael meant to imply this. But the general similarity is suggestive. The figures in the Kortlandt paper (1940) illustrating various phases of the sexual display do not show the throat bulging outward as does that of *penicillatus*. The pouch of *carbo* is described in some sexual situations as being "stretched out straight" (Kortlandt, 1940:425, figs. 21, 22). But it is protruded angularly in threat displays (*op. cit.*, figs. 12 ff.) and by begging young (*op. cit.*, fig. 26). There is an angular protrusion of the throat, caused by depression of the hyoid apparatus, in the begging of young *auritus* (Lewis, 1929:51-52).

In the second part of its display analogous to the advertising of *penicillatus*, *carbo* throws the head backward but the bill instead of pointing upward is directed toward the tail. Then the head is brought slowly forward and back to the same position repeatedly; at this time the bird utters gurgling sounds ("das Gurgeln") (Kortlandt, 1940: 423). In the third part ("dritte Phase") the head and neck are stretched forward and silently swung from side to side. *Carbo* makes no hammer-like strokes.

Reactions to this display by the opposite sex are of two kinds: (1) a stretching and ruffing out accompanied by a characteristic utterance; (2) a hopping all around and over the other member of the pair. This hopping is probably homologous to the "hop" of *penicillatus* but there is no bow and upward stretch and "the throat-sac is stretched out straight and the neck is presumably pumped up with air from the lungs" (Kortlandt, 1940:425). Kortlandt also says, "hopping is that expression-movement in particular through which the standing partner [male acting] makes known his desire for copulation." Possibly this function may be ascribed to the *penicillatus* hop, although it certainly occurs also in non-sexual situations. Selous (1901:166-167) describes a "great pompous hop" in *aristotelius*. Here also, apparently, the preliminary bow is missing. No hopping around or over the other member of the pair was noted in *penicillatus*.

Carbo, when mounting, "springs" upon the back of the prone bird, sometimes flapping the wings as it does so (Kortlandt, 1940:421). *Penicillatus* deliberately steps upon the back when performing such an act and has never been seen to beat its wings at this time.

Kortlandt describes threat displays of *carbo* analogous to those of *penicillatus*: "with feathers impressively ruffled, wings raised (almost like a swan), angularly forward projecting throat-sac" (1940:415). This is accompanied by a characteristic cry. There seems to be no head twisting. Kortlandt's phraseology, "Japanese wrestlers," in describing the way rivals grip bills and push and pull while fighting would apply well to *penicillatus*. Both species peck and bite fiercely and, in *carbo* at least, actually draw blood (Kortlandt, 1938:9). Selous (1927:70-71) describes a fight of this nature in *aristotelius*.

Pairs of all four species at the nest writhe and twist their necks together as part of the mutual display I have called "billing." Perhaps there is more nibbling at and clasping of each other's bills in *penicillatus* than in the other species. The focus of attention at the gular pouch in *penicillatus* is noteworthy; such focus does not seem to be mentioned for the other species.

Identification of sex and the role of the sexes in display.—Portielje (1927) and Haverschmidt (1933) state that the display of *carbo* ("Flugelklappen," "Gurgeln," and "dritte Phase") comparable to the advertising display of *penicillatus*, is done by

the females only. They called it a copulatory invitation and said that the males come and reply by stretching, ruffing out, and hopping.

Lewis shot an *auritus* while wing-flapping and found it to be a male. Haverschmidt thought Lewis was mistaken because *auritus* is closely related to *carbo*. Nevertheless Haverschmidt noted some reversals that he was unable to explain. Kortlandt, in his first paper (1938), said that either sex performs either display, called the birds the "sitting" and "standing partner," and said that coition could be effected with either bird mounting.

In the present study sex identification was made in the field by correlating the general body size and the length and depth of the bill with certain kinds of behavior. Measurements (in millimeters) of specimens of adult Brandt Cormorants (nearly all taken in central California) in the collections of the California Academy of Sciences and the Museum of Vertebrate Zoology revealed the following size differences:

	Maximum	Minimum	Average
Length of bill from gape			
20 females	98.9	88.5	92.75
26 males	108.2	89.6	101.33
Depth of bill			
18 females	10.8	9.1	10.10
26 males	13.8	10.6	11.74
Wing length			
22 females	276.	258.	270.00
27 males	305.	274.	291.22

Although these differences might seem too minute for field work, they proved helpful in the field when direct comparison could be made between the bills of members of a pair. The size differences were correlated with the following characteristics of behavior: (1) advertisers on stations were big billed; (2) the birds visiting them were small billed; (3) the big-billed birds usually mounted later in the cycle than the small-billed; (4) big-billed birds defended a territory, fought, brought most of the nesting material to the nest. Very occasionally it was impossible to distinguish a difference in bill sizes of members of a pair; in such event no data on them were used.

When the notes on 91 mountings were analyzed the following results were obtained:

	Small-billed bird mounts	Big-billed bird mounts
Coition probable	0	19
Coition doubtful	8	29
No coition	32	3
Total	40	51

Of course when the cloacae do not meet it is obvious that there is no coition; whereas it is almost impossible to make certain that it does occur. It was therefore concluded that the big-billed, advertising birds were males. All other displays, including both the upper and lower precoitional postures and even mounting, are performed by both sexes.

In 1939 I reached the foregoing conclusions independently. In his paper of 1940 Kortlandt modified his earlier statement in regard to the roles of the sexes and says that in *carbo* the males alone perform the wing-flapping, except on rare occasions when a female might do it after pairing up, and that all other displays are entirely mutual, being done by both sexes. Advertising after pairing up is rare in *penicillatus* and on occasions when it has been observed and sex identification made the advertiser was a male.

Kortlandt finds that either sex may mount (as in *penicillatus*) with the important difference that in *carbo* the reversed position occurs "especially if the pair has been married for some time" (translation, 1940:421). He also says that "in the reversed

position the female less often seeks contact with the cloaca than does the male in normal copulation" (1940:429). In this latter respect his observations agree with mine. He continues by saying that this lack of cloaca seeking "is only a difference of intensity. Basically there is thus but a graduated distinction between the male and female sexuality in cormorants."

Kortlandt stresses the importance of voice difference in sex-recognition in *carbo* (the female has a particular utterance employed only in the breeding season). He also has found a difference in bill lengths, and in the width of the head, the males being larger as I had found in *penicillatus*. However, he remarked (in correspondence) that 5-10 per cent of his females have larger bills than their own mates.

Thus with the exception of the sexually different voices in *carbo*, and the fact that the swollen-necked stroke as well as the flutter is an exclusively male action in *penicillatus*, and that mountings with the female uppermost occur more frequently early in the cycle in *penicillatus*, rather than late (as implied by Kortlandt), the bisexual character of the behavior is apparently quite similar in the two species.

Discussion.—It is of course entirely possible that I have missed sounds made by *penicillatus* during sexual actions. If I have not, the most striking difference between this species and *carbo* is the distinct sounds made by the two sexes of the European Cormorant and the lack of any sounds made during these actions by *penicillatus*. Moreover, pairing-up is impeded in *carbo* when a bird has a "divergent" voice, although copulation is not (Kortlandt, 1940:430). Lewis (1929), also, records a very definite "song" uttered by *auritus* while wing-flapping.

At the La Jolla colony observations were made on advertising male Brandt Cormorants at close range, about 100 feet, and although the two types of call notes already described could be heard, one of them associated with threat display, no sound could be detected from advertisers. However, a variety of sounds uttered by several individuals of *Phalacrocorax auritus* perching at an even greater distance from me could be easily heard. One of these notes was undoubtedly that which Lewis (1929:61) calls "the 'cane-tube' croaking or rattling," because "it sounds like a rather rapid series of clicks, made in a hollow cylinder of cane or bamboo. It forms part of the male's courtship address, but is also used in other ways during the nesting season." From a distance of more than a hundred feet and under the same general surf conditions as at La Jolla, sounds uttered by a pair of Pelagic Cormorants (*Phalacrocorax pelagicus*) during displays have been heard by me.

Might it not be possible that in *penicillatus* voice has not been particularly evolved, display effects being achieved by striking posture and the brilliance of the pouch alone, whereas *carbo* has developed a striking pattern of plumage and posture, but particularly voice, and *auritus* perhaps has some degree of all three qualities, pattern, posture, and voice?

The male *auritus* selects both territory and nest site (Lewis, 1929:87). The female *carbo* goes from one wing-flapping male to another and, when a female remains, the male gets nesting material (the male, as in *penicillatus*, is the principal gatherer of material). But the male *carbo* also takes a "circular flight," always returning, however, to his own nest and never flying to other females (Kortlandt, 1940:431).

Noble, Wurm and Schmidt's (1938) description and illustration of the Night Heron's gaining "dominance" and "billing for dominance" suggests certain mutual display postures of the Brandt Cormorant. I am not sure, however, whether or not it would be correct to ascribe "dominance" reactions to the latter species.

Several writers have mentioned the importance of nesting material in the sexual cycle of various species. The material often serves some other purpose in addition to forming a structure to hold the eggs. When a Brandt Cormorant is stretched out in the

prone position of the lower precoitional posture, very frequently it picks up and nibbles pieces of material. It seems probable that this should be considered a "substitute activity" as characterized by Lack (1941:429). Unpaired male Brandt Cormorants bring nesting material to their stations, place it there with the nesting-material ceremony and advertise over it. This activity of bringing material in phase I is functionless as far as constructing a nest is concerned, since the material never accrues because of pilfering. Thus the activity might be interpreted as of symbolic display, that is, in which an act normally playing some other part in behavior is introduced into display (Lack, 1940:173). But when a female remains to guard, a nest rapidly takes shape and what was an activity without function in phase I becomes functional if the pair becomes permanently mated and passes into phase III.

Since the display of the male in bringing material to the nest is essentially the same in phase I, before he is paired up, as it is in phase II when a female enters into the ceremony, the use of the term "symbolic display" applied to it in phase I may seem questionable. In phase II the manner of gathering and "presenting" the material remains the same and it is the external situation which has changed. On the other hand, when we consider the many times that "precoitional postures" do not lead directly to coition, it may be that the prone position assumed by either sex is a symbolic display in the sense meant by Portielje (1927). This writer refers to various actions of *carbo* as symbolic. Among these he interprets wing-flapping as symbolic of copulation. Kortlandt (1940:423) comments that "it is remarkable that an almost exclusively male behavior [wing-flapping] should arise from the copulation position of the lower bird, that is to say from a predominantly female position!" As a female approaches an advertising male *penicillatus* the latter gradually merges the swollen-necked strokes into the thin-necked thrustings of the lower precoitional posture (see above). Appreciating these actions together with the general bisexual behavior of both *penicillatus* and *carbo*, perhaps the phrase "reversed symbolic display" has meaning.

Reverse mounting has been described for the Great Crested Grebe (Huxley, 1914: 505), the Moorhen (Selous, 1902:197), and the domestic pigeon (Whitman, 1919:97). I have witnessed it also in Band-tailed Pigeons (*Columba fasciata*) in the wild state (unpublished observation). In discussing the reverse mounting of the grebe, Huxley suggests the possibility of genital products passing either way. In the case of the Brandt Cormorant it does not seem necessary to postulate this, as it seems fairly well indicated that no cloacal contact is made when the female mounts.

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SUMMARY

This study of the Brandt Cormorant (*Phalacrocorax penicillatus*) was made on the coasts of Marin, Monterey, and San Diego counties, California, in the breeding seasons from 1933 through 1940.

Display of three types was observed: (1) advertising performed by males and responded to by females, (2) mutual and bisexual displays performed by both sexes, and

(3) threat displays by both sexes. In many of these the distended gular pouch is conspicuous.

The sexual cycle may be divided into three phases: (I) advertising display by males during which the females visit them, (II) pairing-up, temporary or permanent, attended by mutual displays, (III) egg laying and rearing of young.

Females move about on the crowded rock occupied by the colony, passing from one advertising male to another, sometimes remaining with each for a few minutes only. Males do not advertise when females are with them. When the pairs, now in phase II, are together they perform a series of mutual displays. Immediately upon the female's arrival the *male* assumes the lower precoitional, female-like posture, the female the upper precoitional, male-like posture. The female may even mount and behave very much like a male. Reversal, with the male mounting, may occur immediately following this or not until later. It seems well indicated that insemination occurs only with the male uppermost.

Males gather most of the nesting material; both sexes arrange it. The material is gathered by the male even before a female is present. Threat displays are used to guard territory and nesting material. Prolonged fights have been observed.

This colonial bird has an individual territory, although the area defended is only a few square feet around the nest. The males advertise at this place and keep other males away; the females come there for copulation and the nest is built there.

Reverse mounting has been noted by other observers for other species. Recent work by Kortlandt on *Phalacrocorax carbo* in Holland records "wing-flapping" by males only, while all other displays and mounting are performed by both sexes, as in *P. penicillatus*. In *P. carbo* there is an important sex difference in voice not noted for *penicillatus*.

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Carmel, California, December 1, 1941.

A NESTING COLONY OF RING-BILLED GULLS IN CALIFORNIA

By JAMES MOFFITT

The nesting colony of Ring-billed Gulls (*Larus delawarensis*) here reported may be the southernmost one occupied today. W. W. Cooke (Colo. Agric. Exp. Sta. Bull. 56, 1900:192) reported that in 1898 this gull bred at San Luis Lakes, Alamosa County, Colorado (approximately 37° 45′ N. lat.), but it is not known whether the bird still nests there. Otherwise, the A. O. U. Check-list (4th ed., 1931:133) records the species as breeding south to southern Oregon, northern Utah, and elsewhere in the United States, only north of the 42nd parallel of latitude. The Check-list apparently considered as indefinite Willett's (Condor, 21, 1919:196) record strongly suggesting breeding at Clear Lake, Modoc County, California, just south of the 42nd parallel. Furthermore, there appears to be considerable doubt attached to the nesting record from northern Utah (see Behle, Condor, 37, 1935:26).

On April 26 and July 1, 1931, the writer found Ring-billed Gulls to be numerous about Tule Lake, eastern Siskiyou County, California, where they were apparently nesting on islands in the Federal Wildlife Refuge. No California Gulls (*Larus californicus*) were observed here. An adult male Ring-billed Gull, whose testes each measured 10 by 18 mm., was collected immediately south of the refuge boundary on the earlier date.

In the spring of 1940, J. S. Dow of the California State Division of Fish and Game advised me that Ring-billed Gulls were nesting in Honey Lake Valley, Lassen County, California. On May 3, 1940, he and the writer visited an islet-studded body of water which is variously known as Hartson Reservoir or Dakin Lake. This artificial lake of approximately 1000 acres extent adjoins the northwestern shore of Honey Lake, from which it is separated by a sand ridge of from 150 to 300 yards width. The locality is at approximately 40° 15′ north latitude. Inquiry of residents of the region elicited the information that the gulls had nested here for a number of years, certainly for 20 or more, and because Hartson Reservoir contained water in the interval from the middle 1920's to 1938, when Honey Lake was dry, the colony was able to persist throughout this period.

It is of interest to note that the California Gull is known to nest at Eagle Lake, Lassen County, California (Grinnell, Dixon and Linsdale, Univ. Calif. Publ. Zool., 35, 1930:226), a distance of about 28 miles, air-line, northwest of the present colony. It also breeds commonly at Pyramid Lake, Nevada (Hall, Condor, 28, 1926:87), about 45 air-line miles distant, east-southeast of Honey Lake. Thus, the present colony of nesting Ring-billed Gulls is, as it were, sandwiched between two breeding localities of the larger species.

Dow took the writer to a grass-covered islet about an acre in extent upon which were found approximately 150 gull nests. No completed sets were observed, most nests containing only one or two eggs, while many were empty. Other gulls appeared to be nesting on a near-by islet. Several fresh eggs were collected from the incomplete clutches. All of the gulls observed appeared to be Ring-bills. Later, on June 9, 1940, Dow collected three gulls of this species from the colony, which he presented to the California Academy of Sciences where they are now preserved as skins in the ornithological collection, numbers 57506-57508.

The writer alone visited Hartson Reservoir on May 14, 1941, when numbers of gulls were observed from a distance to be nesting on the islet from which the eggs were collected the previous season. Two other colonies of nesting Ring-billed Gulls were found on neighboring islets close to shore, a half a mile distant. One of the latter con-

sisted of about 75 nests, nearly all containing completed sets with the birds incubating. The majority of nests contained three eggs, but two sets of five and one of four eggs, each seemingly the product of a single female, were collected. Also seven sets of three eggs each were taken. Incubation of these eggs ranged from just started to one-fourth completed. The average measurements of 20 of these eggs are 60.25 by 42.87 millimeters. The eggs of this series have the following extreme measurements: **65.6** by 43.25, 62.38 by **45, 55.6** by 41.45, and 58.8 by **40.7** millimeters. These measurements are slightly greater in average, and for maxima and minima, than measurements of 40 eggs of this species provided by Bent (U. S. Nat. Bull. 133, 1921:135); but they are considerably less than his average and maxima measurements for eggs of the California Gull (*op. cit.*:127). An adult male Ring-billed Gull whose testes each measured 8 by 16 millimeters was collected from this colony on May 14, 1941, and is now preserved as a complete skeleton in the ornithological collection of the California Academy of Sciences. This bird weighed 511 grams.

The fresh gull eggs collected by Dow and Moffitt were in the ensuing 24 hours transported to San Francisco, where on noon of May 4, 1940, they were set in a small electric incubator. The eggs did not move on cooling until the twenty-third day of incubation, when motion of the chicks caused all four to do so. At 9 a.m. on May 28, or when incubated three hours less than 24 days, one egg, the first one to hatch, was observed to be pipped and the other three were cracked at the place where they soon were pipped. The young did not hatch, however, until more than 48 hours later. During this period, they uttered frequent chirps within the shells. One of these eggs hatched on the morning of May 30, two others at 4:30 p.m. that day, and a fourth at 11 a.m. on May 31. Their incubation periods, therefore, ranged from somewhat less than 26 days to nearly 27 days. Bent (*op. cit.*:135) states that the incubation period in this species is about 21 days.

The young gulls became quite active a few hours after hatching, pushing themselves about within the incubator. They frequently uttered their raucous call note which was not like the adults' cry but was similar to the warning note given by the Forster Tern (*Sterna forsteri*), when its nesting colony is disturbed.

The four young gulls were killed at ages of 24, 17 (two individuals), and 2 hours, respectively, and then prepared as study skins. At these ages, the first three mentioned birds weighed, respectively, 37, 34.3, and 35.2 grams. The egg tooth was present in each individual at the time of its death.

Considerable variation in color existed in the plumages of these four young gulls, no two being exactly alike. Bent (*op. cit.*:136) states that two distinct color phases occur in the downy plumage of this species. One which he terms the gray phase has the upper parts "smoke gray" or "pale smoke gray;" the other, or buffy phase, has these parts "pinkish buff" or "vinaceous buff." One of the present downies is clearly of the gray phase, its upper parts being a mixture of "pale smoke gray" and white, with no buffy tint here or on the flanks. Two other downy young are close to this bird in color, but exhibit varying degrees of faint "vinaceous buff" tipping on the longer plumage of their backs and flanks. The fourth downy has considerably more of this buffy tint so as to give to its dorsal and ventral surfaces and flanks a decided "vinaceous buff" hue, overlying basal down close to "smoke gray" in color. Thus, none of the present series of downy young seems to exhibit the extreme buffy phase of Bent, with the upper parts "pinkish buff" (colors from Ridgway, 1912).

Variation also existed in the colors of the feet and legs of the young gulls, upon which notes were taken both in life and immediately after death. One downy had these parts, including the webs, "pale vinaceous-drab." In another, the same parts were much darker, ranging between Ridgway's "Quaker-drab" and "deep Quaker-drab." The other

two downies were intermediate in this respect, having slightly darker feet and legs than were recorded for the first bird.

The four young agreed in colors of other soft parts. Their irises were dark hazel, nearly black. Their bills were pinkish flesh color at the tips of both mandibles, with the egg tooth clear white. Elsewhere, the bills were dark slate, nearly black, with the gapes and insides of the mouth pinkish flesh color.

Summary.—Ring-billed Gulls probably breed regularly at Tule Lake, Siskiyou County, and at Clear Lake, Modoc County, California. Both localities are just south of latitude 42. Several nesting colonies, totaling 250 or more pairs, nest regularly near Honey Lake, Lassen County, California, in approximately latitude 40° 15′ N. Adult gulls and their eggs, from which downy young were hatched, were collected here in 1940 and 1941. The incubation period was determined to be about 26 days, instead of about 21 days as reported by Bent. Call notes of the downy young are described. Considerable variation in color of the plumage and of the feet and legs was found to exist among four young Ring-billed Gulls, which were less than 24 hours old.

California Academy of Sciences, San Francisco, California, March 10, 1942.

BIRDS OF THE CENTRAL PANHANDLE OF TEXAS

By JAMES O. STEVENSON

The writer began a survey of the bird life of the Texas Panhandle in 1935 while engaged in studying the development of Palo Duro Canyon State Park, situated about 20 miles southeast of Amarillo. The Panhandle proper contains 26 counties and, although larger in area than the state of West Virginia, it has received surprisingly little attention on the part of naturalists. This is perhaps understandable as the high plains lack pronounced diversity of habitats and topography. Those who have investigated the canyons, carved by streams in the eastern Staked Plains, have been well rewarded, as these "breaks" are oases on the prairie and are inhabited by many birds and mammals.

The only extensive published accounts on birds of the Panhandle which I have found were written by McCauley (Bull. U. S. Geol. and Geog. Surv. Terr., 3, no. 3, 1877) and by Strecker (Baylor Univ. Bull., 13, nos. 4 and 5, 1910). Seventy-eight brief newspaper articles on birds of Palo Duro Canyon and other sections of the Panhandle, written by Kenneth Carlander, appeared in the Amarillo News in 1934. Only fragmentary references to the birds of the Panhandle are contained in the Pacific Railroad Reports and accounts of army explorations.

This paper deals mainly with birds observed and collected in an extremely interesting region of the Panhandle, namely, the plains in the vicinity of Amarillo and the Palo Duro Canyon system which is drained by streams tributary to the South Fork of Red River. The survey was confined almost entirely to Randall, Potter and Armstrong counties. Many notes on water birds and other species, relating to the entire Panhandle, have been supplied by Philip F. Allan of the United States Soil Conservation Service.

The flat or rolling plains, which are used for grazing of livestock or crop production, vary in elevation from 3400 to 3800 feet. This land contains many small streams and also a number of shallow lakes. As many of these are temporary in nature, they are called "wet-weather" lakes. In Randall and Armstrong counties, Palo Duro Creek (also known as Prairie Dog Town Fork) has cut a colorful gorge, 200 to 800 feet in depth. Palo Duro and tributary canyons possess the most extensive timbered areas of this section of the state. These canyons, with their wealth of vegetation and permanent streams and springs, are highly attractive to bird life.

In the past eight years, several hundred lakes and artificial stock tanks have been developed in the Panhandle by the Soil Conservation Service and other federal agencies. These impoundments have had considerable effect on waterfowl, shore birds, and other water birds. The projects are particularly valuable to waterfowl, especially in periods when the natural playa lakes are dry. Stabilized lake and pond areas have provided nesting places for an increasing number and variety of ducks; and, of course, waterfowl populations increase tremendously in migration periods. For example, as many as 100,000 ducks have been observed at one time on Buffalo Lake, near Umbarger, Texas.

Between 1935 and 1938, Paul Russell, T. F. Smith and the writer spent 100 field days in the region. This includes the summer of 1935 (Russell) and nine short field trips in February, May, August, September, October and December. Although the following list of birds is far from complete, particularly as regards migratory passerine species, it is fairly representative for summer and winter resident birds. Additional collecting of critical specimens is needed.

I am indebted to Dr. H. C. Oberholser of the Cleveland Museum of Natural History for the identification of most of the specimens mentioned in this paper, and to Philip F. Allan for notes and information supplied, through correspondence, on various species.

Note: References to "the park" and "the canyon" refer to Palo Duro Canyon State Park and Palo Duro Canyon, respectively.

Gavia immer. Loon. One seen at Boggy Creek Lake, near Canadian, Hemphill County, in October, 1940, by Philip F. Allan.

Podilymbus podiceps podiceps. Pied-billed Grebe. Common migrant. Two were seen at a wet-weather lake in Randall County, 4 miles south of Amarillo, August 10, 1936. Allan observed a pair building a nest at Buffalo Lake, Randall County, near Umbarger, in July, 1939.

Pelecanus erythrorhynchos. White Pelican. According to Allan, this pelican is a regular migrant in the Panhandle, principally in autumn; the species is sometimes seen in spring at Buffalo Lake.

Phalacrocorax auritus. Double-crested Cormorant. Allan generally finds three or four birds each autumn at Buffalo Lake; presumably these are *P. a. auritus*.

Ardea herodias. Great Blue Heron. Common migrant along lakes and streams.

Casmerodius albus egretta. American Egret. Uncommon fall migrant on the larger lakes of the Panhandle.

Nycticorax nycticorax hoactli. Black-crowned Night Heron. One was seen near the town of Canyon on September 25 and three along the Canadian River, Potter County, on September 27, 1938. Allan found them to be abundant at Buffalo Lake in the autumn of 1939 and reports a colony along the Canadian River, near Canadian, Texas. Mr. L. E. Simms of Canyon informed me that about 100 adults nested in a grove 9 miles west of Canyon in 1934.

Plegadis guarauna. White-faced Glossy Ibis. Allan noted seven at Buffalo Lake on October 30, 1939.

Branta canadensis. Canada Goose. A flock of 11 large geese was noted 10 miles east of Canyon on February 8, 1936. Allan has recorded flocks of one thousand or more geese, of at least two subspecies, in spring and fall migration at Buffalo Lake.

Anser albifrons. White-fronted Goose. Seven were seen at Boggy Creek Lake, near Canadian, by Philip Allan, in September, 1939.

Chen hyperborea. Snow Goose. Allan has noted a few each migration period in flocks of Canada Geese, and a flock of 22 at Buffalo Lake in March, 1939. Mr. Gordon Finney and Col. Steve Rydings saw two at a lake, 9 miles east of Canyon, in the last week of December, 1934.

Anas platyrhynchos platyrhynchos. Mallard. Abundant migrant on all lakes. Mallards nested in 1939 at Buffalo Lake.

Chaulelasmus streperus. Gadwall. Abundant migrant. Allan found a brood of young at Buffalo Lake in July, 1939. He considers the Gadwall to be a common breeding bird throughout the Panhandle wherever conditions are suitable.

Mareca americana. Baldpate. Abundant migrant on Panhandle lakes.

Dafila acuta tzitzihoa. Pintail. Very abundant early spring and fall migrant in the Panhandle. The species nested at Buffalo Lake in 1939.

Nettion carolinense. Green-winged Teal. Abundant migrant.

Querquedula discors. Blue-winged Teal. Abundant migrant. Reported by Allan as nesting at Buffalo Lake in 1939.

Querquedula cyanoptera. Cinnamon Teal. Uncommon migrant on the larger lakes of the Panhandle.

Spatula clypeata. Shoveller. Common migrant on most large lakes.

Nyroca americana. Redhead. Common to abundant migrant on the larger lakes.

Nyroca collaris. Ring-necked Duck. Uncommon migrant in spring and fall on the larger lakes of the Panhandle.

Nyroca valisineria. Canvas-back. Common migrant on the larger lakes. Allan saw a flock of about 200 at Buffalo Lake on March 16, 1941.

Nyroca affinis. Lesser Scaup. Common migrant and winter resident at the larger lakes of the Panhandle; occasionally seen on small lakes.

Glaucionetta clangula americana. American Golden-eye. Uncommon winter resident.

Charitonetta albeola. Bufflehead. Uncommon on the larger lakes in fall and winter.

Erismatura jamaicensis rubida. Ruddy Duck. Common migrant.

Lophodytes cucullatus. Hooded Merganser. Occasionally noted in autumn by Allan.

Mergus merganser americanus. American Merganser. Common winter resident on the larger lakes and streams of the Panhandle.

Cathartes aura. Turkey Vulture. Common summer resident.

Ictinia misisippiensis. Mississippi Kite. This species is still a regular summer resident in suitable localities in the Panhandle. The bird is generally found in the vicinity of cottonwoods along creeks and rivers. I saw two adults in Palo Duro Park on August 10, 1936. Philip Allan (*in litt*. July 8, 1941) states that this kite is "very abundant along Canadian River and tributaries, also Wolf Creek and tributaries. Seen in Potter, Lipscomb, Hemphill, Roberts, Wheeler, Donley and Armstrong counties."

Accipiter velox. Sharp-shinned Hawk. A common summer resident in Palo Duro Canyon; adults and immature birds were observed frequently in 1935 and 1936.

Accipiter cooperii. Cooper Hawk. One was seen by T. F. Smith at the Harold Ranch, Armstrong County, on December 27, 1936.

Buteo borealis. Red-tailed Hawk. A resident of the canyons and adjacent plains; abundant in winter.

Buteo swainsoni. Swainson Hawk. Common summer resident. A migrant flock of 75 was seen 5 miles east of Wildorado on October 3, 1937. Hundreds were observed perched on knolls in farm fields near Amarillo in late September, 1938. The birds, apparently attracted by a horde of grasshoppers, became easy prey to farmers' rifles.

Buteo lagopus s. johannis. American Rough-legged Hawk. A common winter visitor, forming a conspicuous target when perched on telephone or fence posts along highways. Many dead birds of this and the following species, evidently shot by motorists, were found on the Canyon-Amarillo highway in the winter of 1935-1936.

Buteo regalis. Ferruginous Rough-leg. Fairly common winter visitor on the plains; a few nest in the canyons.

Parabuteo unicinctus harrisi. Harris Hawk. One was studied at close range for an hour on September 30, 1937, while it perched in cottonwoods along the creek at the north boundary of the park. I am familiar with this species through association with it in central Texas and am certain of the identification. The presence of this straggler was vigorously protested by several Golden-fronted Woodpeckers and flickers.

Aquila chrysaëtos canadensis. Golden Eagle. This eagle, a regular resident of Palo Duro Canyon, was observed almost daily when we were in the field.

Haliaeetus leucocephalus. Bald Eagle. Mr. W. G. Anderson informed me that he saw four adults on the banks of Palo Duro Creek in the park in February or March, 1936. Mr. L. E. Simms, a taxidermist in Canyon, has noted the species regularly in the canyon, particularly in early winter. His collection contains a mounted adult and an immature bird. There is also a mounted adult in the Panhandle-Plains Historical Museum at Canyon. These specimens were collected by Simms in Palo Duro Canyon in winter, between 1934 and 1937. Measurements of these birds are as follows:

	Exposed culmen	Height of bill at base	Chord of wing
Adult, Panhandle-Plains Museum	62 mm.	40 mm.	23 inches
Adult, Simms Collection	68 mm.	43 mm.	24.75 inches
Immature, Simms Collection	68 mm.	45 mm.	26 inches

On the basis of these measurements, Dr. Oberholser has referred these birds to the northern race, *H. l. washingtoniensis*.

Circus hudsonius. Marsh Hawk. A very common migrant and winter visitor; it may nest here. Allan noted courtship of a pair at Buffalo Lake on May 30, 1941. This is the commonest hawk on the plains in winter. Russell observed a number near park headquarters in July and August. Fall migration begins in late July.

Pandion haliaëtus carolinensis. Osprey. According to Allan, the Osprey is a rare spring and fall migrant in the Panhandle. He has seen a few at Boggy Creek Lake and at Buffalo Lake.

Falco mexicanus. Prairie Falcon. A fairly common resident of Palo Duro Canyon, nesting on cliff ledges. This falcon is more common in winter than in other seasons; it was often noted cruising over the plains or perched on telephone poles.

Falco peregrinus anatum. Duck Hawk. Philip Allan has seen a few in the Panhandle; one was noted at Buffalo Lake, May 1, 1941.

Falco sparverius sparverius. Sparrow Hawk. Common resident of the canyons and plains. One was collected on September 24, 1938, one mile west of Canyon.

Colinus virginianus. Bob-white. This quail is common in scrub oak country of the eastern Panhandle but it is rarely seen in the Palo Duro region. Russell saw several in the canyon in 1935 and a flock of 30 was observed on the Elkins Ranch, Randall County, on September 30, 1937. Local persons informed me that many quail, trapped in Georgia, were released in the canyon a number of years ago.

Callipepla squamata. Scaled Quail. "Blue Quail" are common residents of the canyons and adjacent mesquite areas but are less often seen on open farm lands. A late nest, containing 11 eggs, was discovered in the park on September 9, 1935. This nest was later deserted. Several were noted in mesquite thickets below the cap rock, 12 miles east of Silverton, Briscoe County, on September 29, 1937.

Grus canadensis. Crane. Large flocks of cranes (*G. c. canadensis* ?) were observed in migration in Randall, Potter and Oldham counties, in October, 1937. Allan reported cranes to be abundant migrants each spring and fall at Buffalo Lake; a flock of four or five thousand spent the winter of 1940-1941 at Buffalo Lake.

Porzana carolina. Sora. One was flushed from a tule marsh, one mile east of Canyon on September 25, 1938.

Fulica americana americana. Coot. Very common migrant. Allan found coots nesting at Buffalo Lake in the summer of 1939.

Oxyechus vociferus vociferus. Killdeer. Very common summer resident near streams in the canyons and at lakes and tanks on the plains.

Capelia delicata. Wilson Snipe. One was seen on May 3, 1936, and four on September 25, 1938, on mud flats of Tierra Blanca Creek, near Canyon.

Numenius americanus. Long-billed Curlew. A very common migrant on the plains. Allan (*in litt.*, July 8, 1941) states that curlews nest in the northern part of the Panhandle and are regular breeding birds of Dallam County.

Bartramia longicauda. Upland Plover. A regular summer resident of range and cultivated farm lands; observed numerous times in fields within the city limits of Amarillo and at near-by lakes.

Actitis macularia. Spotted Sandpiper. A summer resident along Palo Duro Creek in Randall and Armstrong counties and at certain lakes and tanks in the vicinity of Amarillo.

Tringa solitaria. Solitary Sandpiper. Three were seen at a small lake, 4 miles south of Amarillo, on August 10, 1936.

Totanus melanoleucus. Greater Yellow-legs. Six were noted at the same lake where the Solitary Sandpipers were seen, on October 2, 1937, and two were noted near Claude, Armstrong County, on September 24, 1938.

Totanus flavipes. Lesser Yellow-legs. A common migrant; recorded in May and from July to October.

Pisobia melanotos. Pectoral Sandpiper. One was noted on a mud flat on Tierra Blanca Creek, 1 mile northeast of Canyon, on September 25, 1938.

Pisobia bairdii. Baird Sandpiper. A few were seen at lakes near Amarillo on August 10 and 11, 1936, and on October 2, 1937. One was found at a pond, 10 miles south of Claude, on September 24, 1938.

Pisobia minutilla. Least Sandpiper. Two were seen at Tierra Blanca Creek, near Canyon, on May 3, 1936.

Limnodromus griseus. Dowitcher. A flock of 13 was noted at a pond, 10 miles south of Claude, on September 24, 1938.

Ereunetes mauri. Western Sandpiper. Fairly common migrant at small lakes in spring and fall.

Recurvirostra americana. Avocet. One was observed at Canyon on May 3, 1936, and five at a lake 4 miles south of Amarillo on October 2, 1937. Reported by Carlander and Allan as a breeding bird in the Panhandle.

Phalaropus fulicarius. Red Phalarope. A mounted female collected by L. E. Simms on October 12, 1933, near Canyon has been reported by the writer (Condor, 39, 1937:92).

Steganopus tricolor. Wilson Phalarope. Four were noted swimming in a lake 4 miles south of Amarillo on August 9, 1936.

Larus argentatus smithsonianus. Herring Gull. Allan considers this gull to be a fairly common migrant and winter resident in the Panhandle.

Larus delawarensis. Ring-billed Gull. An adult was seen at a lake 4 miles south of Amarillo on October 2, 1937. This species is listed by Allan (*in litt.*, July 8, 1941) as a "common migrant and winter resident."

Sterna antillarum. Least Tern. Reported by Allan as a rare migrant in the Panhandle.

Chlidonias nigra surinamensis. Black Tern. A flock of six was found at a lake 4 miles south of Amarillo on August 10, 1936.

Zenaidura macroura. Mourning Dove. This dove is an abundant summer resident in the Panhandle. It nests in shade trees about farm houses and in hackberry, juniper, mesquite and other trees of the canyons. Young birds were found in nests as late as September 1.

Coccyzus americanus americanus. Yellow-billed Cuckoo. A common summer resident of timbered canyons in which nests and young have been observed. An adult male was collected on August 10, 1936, at the Harold Ranch, Armstrong County, and an adult female on August 11, 1936, at the Elkins Ranch, Randall County.

Geococcyx californianus. Road-runner. Common resident of the canyons and mesquite-covered plains of the region; occasionally noted on open farm lands.

Tyto alba pratincola. Barn Owl. Allan (*in litt.*, July 28, 1941) states that M. S. McMurtrey photographed young Barn Owls in a nest in a canyon at Channing, Hartley County, on July 24, 1936.

Bubo virginianus. Horned Owl. Horned Owls, probably *B. v. pallescens*, are common residents of Palo Duro Canyon and other wooded canyons of the region.

Speotyto cunicularia hypugaea. Burrowing Owl. A common resident of prairie dog towns on the plains. Several were seen on Mesquite Mesa, Randall County.

Asio wilsonianus. Long-eared Owl. One was found by Philip Allan in a canyon near Memphis, Hall County, in the "fall of 1938."

Chordeiles minor. Nighthawk. Nighthawks are common in summer in the region and nest on the plains.

Megaceryle alcyon alcyon. Belted Kingfisher. A common summer resident along streams in Palo Duro Canyon where a few remain in winter. Russell found kingfishers nesting in bluffs along Palo Duro Creek in 1935.

Colaptes auratus. Flicker. Several were seen by Smith in cottonwoods and junipers along Palo Duro Creek, December 27 to 31, 1936. About 15 were observed near the north end of the state park and on the adjoining Elkins Ranch, September 30 to October 1, 1937.

Colaptes cafer collaris. Red-shafted Flicker. Common in winter in Palo Duro and adjacent canyons. Several were observed and one collected on the Elkins Ranch on September 30, 1937. Flickers were very common in the canyon and also along the Canadian River in Potter County, September 24 to 27, 1938.

Centurus aurifrons. Golden-fronted Woodpecker. This noisy and conspicuous woodpecker is a common resident of Palo Duro Canyon in Randall and Armstrong counties, ranging as far north as Palisades State Park, 12 miles south of Amarillo. The species is closely associated with cottonwoods along streams; these trees are invariably used as nesting sites. In August, 1936, immature, almost full-grown birds, were observed in Palo Duro Canyon State Park. Specimens were collected on the Harold and Elkins ranches in December, 1935, February and December, 1936, and September, 1938.

It is rather strange that McCauley, who explored Palo Duro Creek and most of the other streams in the eastern Panhandle in 1876, does not mention this species in his paper; nor does Strecker list it as present in Armstrong County in 1910. It has been reported recently as the most common woodpecker in Palo Duro Canyon (Carlander, Amarillo News, September 1, 1934). A locally-taken, mounted specimen is in the Panhandle-Plains Historical Society Museum at Canyon.

Philip Allan (*in litt.*, July 28, 1941) informs me that this woodpecker also is found near Canadian, Texas, in the northeastern corner of the Panhandle. It is a fairly common resident among cottonwoods along the Canadian River.

These isolated colonies may be the result of rather recent invasions from the southeast or the species may have been overlooked until recent years. Although the generally accepted range in the state is central and southern Texas, there are published records for north Texas. The writer, in July, 1935, saw Golden-fronted Woodpeckers in Archer and Baylor counties, about 180 miles southeast of the Palo Duro and Canadian areas mentioned above. Whether the species occupies the intervening territory or not is unknown.

Sphyrapicus varius. Yellow-bellied Sapsucker. One was observed in the park on December 20, 1935, and another in Deep Canyon, Elkins Ranch, on December 25, 1936.

Dryobates scalaris symplectus. Texas Woodpecker. A common resident of the oak and mesquite forests in the canyon and the wooded plains. Several specimens were collected in Palo Duro Canyon in December, 1935. One was collected in a mesquite thicket 10 miles northwest of Amarillo on September 27, 1938.

Tyrannus tyrannus. Eastern Kingbird. Allan reports this species as a common summer resident in the northeastern Panhandle.

Tyrannus verticalis. Western Kingbird. Common summer resident of the plains, nesting in orchards and windbreaks around farm buildings. The species occasionally nests in cottonwoods and other trees of the canyon floor.

Muscivora forficata. Scissor-tailed Flycatcher. A common summer resident of the canyons and plains. Flycatchers were often found near ranch houses, nesting in shade trees or on the framework of windmills.

Myiarchus cinerascens cinerascens. Ash-throated Flycatcher. Summer resident in Palo Duro Canyon, Randall and Armstrong counties.

Sayornis phoebe. Eastern Phoebe. One was collected at Dripping Spring, 15 miles southwest of Claude, on September 24, 1938.

Sayornis saya saya. Say Phoebe. One was noted near the park entrance on October 2, 1937. Four were seen (1 collected) in cottonwoods 6 miles northwest of Amarillo on September 26, 1938. Strecker (*op. cit.*: 29) reports the species as common, and nesting, in the canyons and arroyos in Armstrong County.

Myiochanes virens. Eastern Wood Pewee. An adult female, probably a migrant, was collected in Palo Duro Canyon on the Elkins Ranch on August 11, 1936.

Nuttallornis borealis. Olive-sided Flycatcher. One was observed on August 10, 1936, on the canyon floor at the Harold Ranch.

Otocoris alpestris. Horned Lark. Abundant resident of the plains. An immature bird was collected on September 30, 1937, and four taken on December 28, 1936, in Randall County, have been identified as *O. a. enthymia*. According to Dr. Oberholser, this is the breeding horned lark of the Panhandle. A specimen of *O. a. leucolaema* was taken by Smith in Randall County on December 28, 1936. An example of *O. a. lamphrochroma*, collected near Canyon, February 9, 1936, was reported by the writer in the Condor (39, 1937:44).

Riparia riparia riparia. Bank Swallow. Two were noted at a wet-weather lake 4 miles south of Amarillo, on August 10, 1936.

Petrochelidon albifrons. Cliff Swallow. Hundreds of cliff swallows nest each summer in various canyons of the Palo Duro system. Their nests are cemented to the steep faces of cliffs near the heads of Timber, Sunday, Cito and other canyons.

Cyanocitta cristata cyanotephra. Blue Jay. Two migrants were noted at Canyon on September 30, and three were seen and one collected in Palo Duro Canyon on October 1, 1937. Three were found in Palisades State Park on September 26, 1938. *Cyanotephra* was described by Sutton (Auk, 52, 1935: 176-177) from a specimen collected at Kenton in the Oklahoma Panhandle. Sutton considers this to be the breeding race of the blue jay in the western Great Plains region.

Aphelocoma californica woodhouseii. Woodhouse Jay. Four were observed on a juniper-covered hillside near Dripping Spring, 15 miles southwest of Claude, on September 24, 1938. One of these was collected. Several were noted in mesquite thickets north of Amarillo and along the Canadian River, Potter County, on September 27, 1938.

Cyanocephalus cyanocephalus. Piñon Jay. L. E. Simms of Canyon has two mounted birds in his collection; he shot these in January or February, 1929, from a large flock found in junipers in Palo Duro Canyon on the Harold Ranch.

Baeolophus atricristatus paloduro. Black-crested Titmouse. The Panhandle race of the Black-crested Titmouse was described by the writer (Proc. Biol. Soc. Wash., 53, 1940: 15-16) from specimens taken in Palo Duro Canyon. This titmouse is a common resident of Palo Duro and wooded tributary canyons in Randall and Armstrong counties. Occupied nests were noted in cavities in cottonwoods in the state park in 1936. A number of adult and immature birds was collected in the months of February, May, August, September, and December.

Psaltriparus minimus plumbeus. Lead-colored Bush-tit. Smith noted a flock of 15 in a juniper thicket in Palo Duro Canyon on the Elkins Ranch on December 26, 1936. A male was collected. Philip F. Allan and D. Douglas saw a flock in Palo Duro Canyon, Randall County, on July 4, 1938.

Thryomanes bewickii cryptus. Texas Bewick Wren. Common resident of canyon thickets in Randall and Armstrong counties. Russell located a nest with young in a soapberry tree in the park on July 16, 1935. A few specimens were collected in May, August and December, 1936.

Catherpes mexicanus. Canyon Wren. A common resident of the canyons of the central Panhandle. Birds were frequently heard singing in summer from canyon walls in the park.

Salpinctes obsoletus obsoletus. Rock Wren. Common resident of the gypsum bluffs in Palo Duro Canyon. A family group, which included four young, was seen on the canyon road at the north end of the park on August 9, 1936.

Mimus polyglottos. Mockingbird. A common summer resident in towns and near farm buildings on the plains, also nesting in canyons. A few winter in sheltered canyons. One was noted on December 20, 1935, and another on December 30, 1936, in junipers in the state park.

Toxostoma rufum. Brown Thrasher. Two were found in a tamarisk thicket along the Canadian River, 20 miles northwest of Amarillo, on September 27, 1938. Allan classifies this species as a not uncommon summer resident at Canadian, Texas.

Oreoscoptes montanus. Sage Thrasher. One was collected in Palo Duro Canyon, Randall County, on February 8, 1936. This bird apparently was wintering far north of the usual winter range of the species.

Turdus migratorius. Robin. Migrant and common winter visitor to the juniper thickets of the park and vicinity.

Hylocichla guttata guttata. Alaska Hermit Thrush. Smith collected a male on December 26, 1936, near Palo Duro Creek, 1 mile north of park headquarters on the Elkins Ranch.

Sialia currucoides. Mountain Bluebird. Common winter resident in juniper forests in the canyons. Flocks of several hundred birds were noted in the months of December and February in the park. Two were seen at the park entrance on October 2, 1937.

Myadestes townsendi. Townsend Solitaire. Common on the canyon floor in winter. In December of 1935 and 1936 small groups were noted in the park and on adjoining ranches. One was collected in cottonwoods 20 miles northwest of Amarillo on September 27, 1938.

Polioptila caerulea. Gnatcatcher. Rather common summer resident of juniper and mesquite thickets of Palo Duro and Cito canyons. Russell found a nest containing young in the park on

July 11, 1935. Adults were observed feeding young out of the nest on the Harold Ranch on August 10, 1936.

Regulus satrapa satrapa. Eastern Golden-crowned Kinglet. Smith noted a few on the Elkins and Harold ranches, December 25 to 27, 1936. One specimen was collected.

Corthylio calendula calendula. Ruby-crowned Kinglet. Smith noted single birds on the Elkins and Harold ranches between December 25 and 31, 1936. Two were seen at McSpadden Lake on October 1, 1937. Four were observed and one collected along the Canadian River, 20 miles northwest of Amarillo on September 27, 1938.

Bombycilla garrula pallidiceps. Bohemian Waxwing. Smith noted a flock of 12 flying over Palo Duro Creek, on the Elkins Ranch, Randall County, on December 26, 1936. A male, which he collected, is the first record of the species for Texas.

Bombycilla cedrorum. Cedar Waxwing. Observed in February and December, 1935, and in February, 1936. Flocks of from 10 to 75 birds were noted feeding on juniper berries in Palo Duro and Palisades parks.

Lanius ludovicianus. Loggerhead Shrike. Common summer resident on the plains, a few remaining through the winter. They were observed nesting in trees near ranch houses and in mesquite on Mesquite Mesa in the park. One collected 4 miles east of Canyon on September 26, 1938, has been identified as *L. l. nevadensis*.

Vermivora celata celata. Orange-crowned Warbler. One was collected from a mesquite near Palo Duro Creek, Harold Ranch, on May 3, 1936. Many were observed along the Canadian River, 20 miles northwest of Amarillo, on September 27, 1938. Two specimens were collected.

Vermivora ruficapilla ruficapilla. Nashville Warbler. Three were noted in cottonwoods along Palo Duro Creek in the park on October 2, 1937. Many were observed and two collected in woods along the Canadian River, Potter County, on September 27, 1938.

Dendroica aestiva. Yellow Warbler. Yellow Warblers are summer residents along wooded streams of the canyons and plains.

*Dendroica audubon*i. Audubon Warbler. Several were noted in Palo Duro Canyon, September 29 to October 1, 1937. Smith observed a warbler which he identified as this species on the Elkins Ranch on December 31, 1936. Four were seen and one collected 2 miles west of Canyon on September 24, 1938. The specimen has been identified as *D. a. memorabilis*.

Geothlypis trichas. Yellow-throat. Two males were observed in a marsh near Canyon on September 25, 1938.

Wilsonia pusilla pileolata. Northern Pileolated Warbler. Several migrants were noted along a creek near Canyon on October 1, 1937. Twenty were seen and one collected in cottonwoods of the Canadian River Valley, 20 miles northwest of Amarillo, on September 27, 1938.

Passer domesticus. English Sparrow. Common permanent resident of towns and farm yards.

Sturnella neglecta. Western Meadowlark. Common resident of the plains; two specimens taken.

Xanthocephalus xanthocephalus. Yellow-headed Blackbird. Rather common migrant along river courses; observed in May and September.

Agelaius phoeniceus. Red-winged Blackbird. Large flocks were noted along streams near Canyon, September 24 to 26, 1938.

Icterus bullockii. Bullock Oriole. Uncommon summer resident, nesting in cottonwoods along streams.

Euphagus cyanocephalus. Brewer Blackbird. Several were found near Silverton, Briscoe County, on September 29 and a flock was seen at Canyon on September 30, 1937.

Quiscalus quiscula aeneus. Bronzed Grackle. Three were noted at a ranch house 10 miles south of Claude on September 24, 1938.

Molothrus ater. Cowbird. Common summer resident. Large flocks, mostly of immature birds, were noted in early August along roadsides in Randall County. An adult and two immature birds were collected on August 9 and 10, 1936. These were identified as *M. a. ater*, "not typical."

Piranga ludoviciana. Western Tanager. A migrant, an adult male, was observed on the canyon flats near the east park boundary on August 10, 1936.

Richmondena cardinalis planicola. Cardinal. This subspecies was described by the writer (Proc. Biol. Soc. Wash., 53, 1940: 16-17) from a specimen taken in Palo Duro Canyon, Elkins Ranch, Randall County. Twenty adult and immature specimens were collected in wooded sections of Palo Duro Canyon in Randall and Armstrong counties.

Cardinals are common residents of this region, occurring in thickets of juniper and hardwoods in the canyons. This form ranges from the central Panhandle east to western Oklahoma.

Hedymeles melanocephalus. Black-headed Grosbeak. Two were noted on the Harold Ranch in Palo Duro Canyon on September 25, 1938.

Guiraca caerulea interfusa. Western Blue Grosbeak. Common summer resident of the canyons, nesting in scrub oak and hackberry groves. Adults were observed feeding young in a nest in the park

on June 29, 1935. An adult male was collected on May 3, 1936, on the Harold Ranch. One was noted in a thicket near the Canadian River, 20 miles northwest of Amarillo, on September 27, 1938.

Passerina ciris. Painted Bunting. Uncommon summer resident of the wooded canyon floor of Palo Duro Park.

Carpodacus mexicanus. House Finch. Resident in Palo Duro Canyon and vicinity. Finches are present throughout the year but are more common in winter. A family group was observed on August 9, 1936, at the north end of the park.

Spinus pinus pinus. Northern Pine Siskin. Two were noted with a flock of cedar waxwings in Palisades State Park on February 8, 1936.

Spinus psaltria psaltria. Arkansas Goldfinch. Resident in small numbers in Palo Duro Canyon; observed in February, May, August, September and December. Two immatures were collected on September 29, 1937, on the Elkins Ranch.

Pipilo maculatus. Spotted Towhee. Uncommon migrant in the canyons. Several were observed on September 30 and October 1, 1937, in grape thickets on the Elkins Ranch. One specimen collected has been identified as *P. m. arcticus*. A male collected by Smith on the Elkins Ranch, December 31, 1936, has been identified as *P. m. montanus*.

Calamospiza melanocorys. Lark Bunting. An abundant migrant on the plains. A few remain in the region in summer but no nests were discovered. The species is an early migrant in autumn; hundreds of adults and immature birds were seen in early August. A flock of 20 was still present near Canyon on October 1, 1937. An adult was collected on May 3, 1936, on Mesquite Mesa, Randall County. Philip Allan (*in litt*., July 28, 1941) states that "nests of the lark bunting were found two years ago [1939] north of Amarillo, near the Canadian River, and this year [1941] young birds have been seen at the same locality."

Passerculus sandwichensis. Savannah Sparrow. Abundant migrant on the plains, some remaining through the winter. One collected 6 miles southeast of Canyon on September 30, 1937, is referable to *P. s. nevadensis*.

Passerherbulus caudacutus. Leconte Sparrow. One was collected on May 3, 1936, in a mesquite thicket along Palo Duro Creek on the Harold Ranch, Armstrong County. This locality is west of the usual migration route through Texas.

Pooecetes gramineus. Vesper Sparrow. A very common migrant on the plains. Two specimens, collected in Randall County on May 3, 1936, and October 2, 1937, represent *P. g. confinis*. A specimen taken on September 30, 1937, 6 miles southeast of Canyon, has been identified as *P. g. definitus*, the breeding bird of the Great Basin.

Chondestes grammacus. Lark Sparrow. Lark sparrows are common summer residents on the plains and in open mesquite areas of the canyon floor.

Aimophila ruficeps eremoeca. Rock Sparrow. Fairly common summer resident of the canyons, inhabiting wooded slopes and ledges. An immature was collected on August 11, 1936. Recorded once in winter: Smith collected an adult on December 25, 1936, in Cooley Draw, Elkins Ranch.

Aimophila cassinii. Cassin Sparrow. Common summer resident on the plains, nesting along fence rows among grasses and "tumbleweeds." Two immatures were collected on August 9, 1936, a few miles south of Amarillo.

Spizella pallida. Clay-colored Sparrow. Common migrant on the plains. One was collected on October 2, 1937, 4 miles south of Amarillo, and another, 6 miles north, on September 26, 1938.

Junco hyemalis hyemalis. Slate-colored Junco. Common winter visitor to sheltered canyons, associating with the following species. Three specimens were collected on December 25 and 26, 1936, on the Elkins Ranch.

Junco oreganus. Oregon Junco. Common winter visitor in the canyons. Specimens of *J. o. shufeldti* and *montanus* were taken on December 25 and 26, 1936, respectively, on the Elkins Ranch.

Spizella passerina arizonae. Western Chipping Sparrow. Common migrant of the plains and canyons. One was collected 1 mile west of Canyon on September 24, 1938.

Melospiza lincolnii lincolnii. Lincoln Sparrow. Six were observed and one collected in thickets along the Canadian River, 20 miles northwest of Amarillo, on September 27, 1938.

Melospiza melodia. Song Sparrow. Uncommon winter visitor to Palo Duro Canyon, where it has been observed in December and February. A specimen of *M. m. juddi*, the Dakota Song Sparrow, was collected on the Elkins Ranch on December 31, 1936. Four were noted on September 27, 1938, in tamarisk thickets along the Canadian River, Potter County.

Rhynchophanes mccownii. McCown Longspur. Common winter visitor on the plains in flocks with the following species. Five specimens collected 8 miles east of Canyon, December 28, 1936.

Calcarius lapponicus. Lapland Longspur. This species is a rather common winter visitor on the plains. A specimen of the Alaska Longspur, *C. l. alascensis*, collected February 9, 1936, 10 miles east of Canyon, has been recorded as the first specimen for the State (Stevenson, Condor, 39, 1937: 44).

United States Fish and Wildlife Service, Washington, D. C. December 10, 1941.

BANDING RECORDS OF CALIFORNIA BROWN PELICANS

By RICHARD M. BOND

On April 16, 1939, E. L. Sumner, Jr., and I visited West Anacapa Island off the coast of Ventura County, California, in the course of a biological reconnaissance of the Channel Islands National Monument. California Brown Pelicans (*Pelecanus occidentalis californicus*) were in the midst of their nesting period at this time. We found them in colonies on the steep south slope and along the ravines on the mesa on the north side of the island. As nearly as we could determine, there were about 2000 pairs nesting on this island. Nest contents ranged from fresh eggs to young practically full size and beginning to feather out. Perhaps half the nests contained young about half grown, with the primaries just beginning to show. One hundred and five of the young were banded, the number being limited by the number of bands, not by the number of candidates for them.

A matter of some interest was finding several pelican nests in island oak (*Quercus tomentella*) and toyon (*Photinia arbutifolia*), some ten or fifteen feet from the ground. I am not aware of other records of this species nesting in trees.

On May 16, 1940, I again visited the Island. This time in company with Messrs. Scoyen, Oberhansley and Fry, of Sequoia National Park. Oberhansley and I banded 450 young in about six hours, this time running out of time and energy, rather than birds or bands.

The known history of the nesting pelicans on Anacapa Island is of some interest. They were apparently first noted there in 1898 on the west island, although the number found was not indicated. Observations of various authors are tabulated herewith; most of the published data are summarized by Willett (1933:18).

Reported status of pelican colonies on Anacapa Islands

Date	Island	Number	Stage	Source
August, 1898	West	Not given	Nearly full grown.	Holder, 1899:71-72
June, 1899	All	None	Not nesting.	Willett, 1933:18
June 5, 1910	East	About 500 nests	Fresh eggs to nearly full grown young.	Willett, 1910:171
March 17, 1911	East (none on West)	"A Perfect Swarm"	Carrying nesting materials.	Burt, 1911:167
May 12, 1912	East (?)	About 200 pairs	Nest building about complete; 2 eggs.	Peyton, 1917:102
June 11, 1915	East (?) West (?)	Colony had increased noticeably	Eggs and newly hatched young; well grown young.	Peyton, 1917:102
March 7, 1916	East (?) West (?)	At least 1500 pairs	Egg laying begun. Egg laying complete.	Peyton, 1917:102
March 2, 1917	?	At least 2000 pairs	Laying complete, 1 nest hatched.	Peyton, 1917:102
March 9, 1930	?	200 nests	"Hvy. Inc. eggs to downy young."	Ashworth and Thompson, 1930:122

Mr. Raymond LeDreau, who has lived on the island since 1930, says that pelicans have nested on West Anacapa every year since then but not on East or Middle Anacapa. He was told by earlier residents that the pelicans left the east island when the lighthouse was established there.

I had visited the island in April, 1935, and found the pelicans in about the same numbers and places on the west island as in 1939, but the nesting cycle was much stretched out, there having been more eggs, and also, on the south side especially, a good many young already able to fly and others nearly fully feathered. This seems to agree with Peyton's observations in 1916.

In 1940 there were rather more birds far down on the south side than in 1939, and the westernmost two ravines on the north side where Sumner and I had banded the previous year were deserted, whereas the easternmost ravine had several hundred nests instead of only a dozen or so. The nesting season had also been retarded at least three weeks, since the young showed, on the average, about the same stage of development as a month earlier the previous year. There were perhaps fewer eggs, however, and more, nearly full-sized young.

In 1941, the island was visited by staff members of the Los Angeles Museum, to whom my thanks are due for their report that the whole colony (still about the same size) had moved to the south slope of the island.

Damage to young in the banding operations was apparently slight. In 1939, one young plunged off a rock and killed itself. (This was on Prince Island, off San Miguel Island, however. Sumner banded 36 young here from which there have been two returns: one found dead September 9, 1939, in Golden Gate Park, San Francisco; and one taken November 23, 1940, at Morro, San Luis Obispo County, California.) In 1940, one young among the many that tried to escape by climbing into the prickly

Fig. 47. Female California Brown Pelican on nest on West Anacapa Island, April 16, 1939. Photo by E. L. Sumner, Jr.

pear cactus died, apparently as a result of running a thorn into the heart. One additional banded young was found dead on the nesting grounds in 1941. In 1939, eggs and young were not molested by other birds during banding operations, but in 1940, gulls fed eagerly on fish regurgitated by the young, and a pair of ravens was seen to carry off at least eight eggs. The adult pelicans were solicitous and did not usually leave the nest until approached within fifteen or twenty feet (fig. 47), and they returned by the time we were one hundred feet or so away.

From the 105 young banded in 1939 there have been seven returns (fig. 48)—

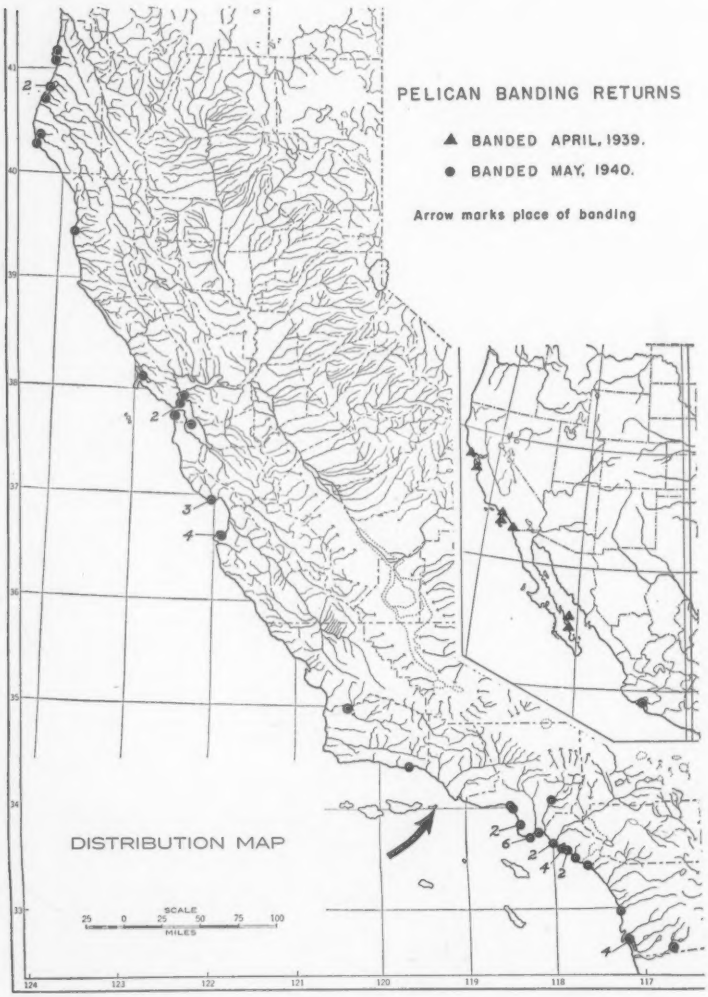

Fig. 48. Location of 59 returns from 555 California Brown Pelicans banded on Anacapa Island in 1939 and 1940.

two shot and the rest "found dead." Dates were: "fall" of 1939; November, 1939 (2); January, 1940; May, 1940; June, 1940; and May, 1941. The farthest north was from Bolinas Bay, Marin County, California, and the farthest south was "shot fall of 1939 at and by a native fisherman, Agua Verde Bahia, Baja California" (about lat. 25° 40′ N.); this is in the Gulf of California.

From the 450 birds banded in 1940, there have been 53 returns, two birds having been reported twice. One was 40-809333: "no information, April, 1941, at Newport Beach, California" and "band number taken 4/11/41 at Newport Beach, California." The other was 40-809869: "caught alive 3/30/41 at Newport Beach, California" and "found dead 5/4/41 at Balboa Beach, California." These localities are only two or three miles apart. These second returns are treated the same as other returns in the following discussion.

The report from farthest north was of a "band found 5/1/41 at Stone Lagoon [Humboldt County], 40 miles north of Eureka, California," about lat. 41° 15′ N., and that farthest south was of a bird "taken 12/16/40 at Colima, Mexico," about lat. 19° N. This latter point is about thirty miles inland, and at some elevation, so it seems possible that the report is erroneous and that the bird may have come from nearer the ocean.

The "center of gravity" of the returns is about 165 miles up the coast from Anacapa Island, or about where the Monterey-San Luis Obispo County line meets the sea. Its location so far north is almost certainly the result of the small population of potential band-readers in Baja California and the unlikelihood of a Spanish-speaking person's making out the short English directions on the bands. The places and dates of the returns seem best explained to me by assuming that there is no migratory movement of the young pelicans and that they may drift about widely within the general range of the subspecies. The returns, of course, give no indication of how closely attached the adults are to the colony where they first nested, nor how far they scatter in winter.

If the report of the bird from Colima is correct, this return is not only the one farthest south but also is the farthest inland. Other inland reports are from Potrero, San Diego County, on August 8, 1941, about twenty-five miles inland; from San Gabriel, Los Angeles County, April 4, 1941, about twenty-one miles inland; from Santa Maria, Santa Barbara County, about eleven miles inland; and from Petrolia, Humboldt County, April 25, 1941. All persons reporting inland records were written, asking for more exact data, but only Mr. Joseph Bognuda answered: "The bird was found two miles east of Petrolia, Lat. 40° 18′ 30″, Long. 124° 15′ 30″, 5½ miles from the ocean, elevation 200 feet. In the Mattole River Valley. . . . I believe this bird wandered up the river for food and was shot by someone." If more banding returns of this caliber were made, we would know much more about bird movements than we now do.

Returns from more or less enclosed bays of the ocean are numerous (both years combined): Stone Lagoon 1, Humboldt Bay 3, Tomales Bay 1, Bolinas Bay 1, San Francisco Bay 4, Monterey Bay 8, Newport Bay 6, and San Diego and Mission bays 5.

Whether the birds were dead or alive when the band number was taken, or if alive, whether sick or well, and whether released or killed, is not clear in many of the returns. Of the 60 birds reported, 32 were "found dead"; 5 were "taken"; 2 were "shot"; 1 was "found"; 1 "leg only found"; 1 "taken from from leg of bird"; 1 "band found"; 1 was "killed by car at Ft. Bragg, California"; and 1 "died from being oil soaked"; concerning two birds no information was given. One bird was "picked up badly injured."

Of the twelve birds that were certainly or possibly released, there were three reports of "band number taken"; four "captured" or "caught"; and five were "caught on fish

line"! I wonder if it can be assumed on this basis that one out of every 90 California Brown Pelicans along our coast ends up on a fish hook.

The dates of the returns from 1940 only are shown in figure 49, and it will be observed that April, 1941, is by far the most important month. As a glance at the map (fig. 48) will show, the greatest concentration of returns was from along the

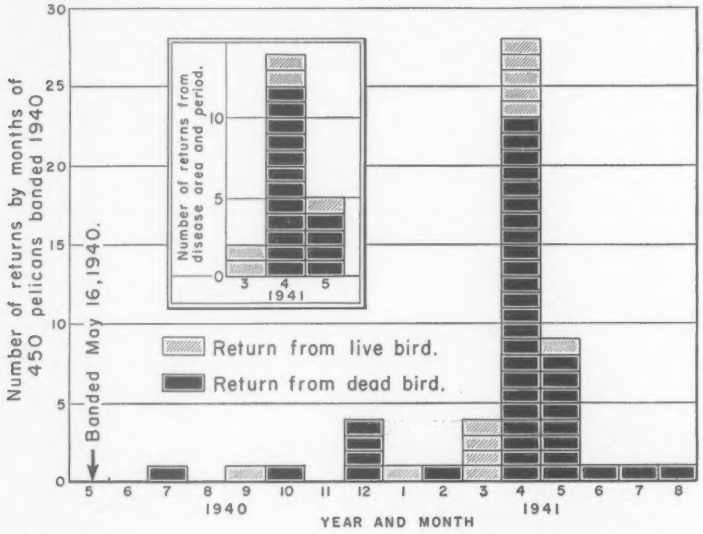
Number of returns by months of 450 pelicans banded 1940
Banded May 16, 1940.
Number of returns from disease area and period.
1941
Return from live bird.
Return from dead bird.
1940
1941
YEAR AND MONTH

Fig. 49. Number of returns, by months, of 450 California Brown Pelicans banded on May 16, 1940.

beaches of Los Angeles and Orange counties. The actual dates of the returns from March through May show no correlation either with storms, which might be expected to have killed the birds, or week-ends when people might be most likely to find them. However, in News From The Bird Banders (16 (2), 1941:11) there is quoted a letter from Dr. Carlton M. Herman, who says:

We were informed some time ago of losses in pelicans occurring at the main pier at the Redondo Beach. Our investigations have shown that this was caused by a paratyphoid bacterial organism. We have not been able to find a similar condition anywhere else along the coast. All birds infected are very sluggish, emaciated and weak and the casual observer is immediately aware that the birds are sick. It was a simple matter in our experience to walk up to these birds on the beach and catch them, which is a rare thing for healthy pelicans.

Dr. Herman has told me that the culture recovered was lost before any experimental work could be done with it, and that he was unsuccessful when, about May 15, he returned to Redondo Beach to secure further specimens, since most of the pelicans had left the spot.

This disease probably accounts not only for most of the birds "found dead" (16) in southern California that spring, but also for many of those caught alive (5). Even so, April and May seem to have been the worst months for the pelicans in regions where the epidemic is not known to have occurred.

SUMMARY AND CONCLUSIONS

1. California Brown Pelicans have nested most years since 1899 on Anacapa Island. They have varied considerably in numbers. The colony sites have varied from

year to year, and the nesting period has varied also. Different colonies have had different nesting dates in the same year.

2. One hundred five young were banded in 1939 and 450 in 1940. Seven returns have been received from the 105 bands (6.66 per cent), and 53 from the 450 bands (11.77 per cent).

3. Returns were received from as far as about 550 miles north and 1400 miles south of the banding point. The "center of gravity" of the returns is a point about 165 miles north along the coast from the point of banding, or about where the Monterey-San Luis Obispo County line meets the sea. The only safe conclusions to be drawn from this latter fact are that the human inhabitants of Baja California are relatively few, or that they do not ordinarily send in banding returns, or both. There is no evidence of any migratory movement on the part of young Brown Pelicans.

4. Percentages of the 59 dated returns by months are: January, 3.4; February, 1.7; March, 6.8; April, 47.4; May, 18.6; June, 3.4; July, 3.4; August, 1.7; September, 1.7; October, 1.7; November, 3.4; December, 6.8. Aside from an epidemic of paratyphoid in southern California, which probably accounts for only about half the returns for March, April and May, 1941, there is no indication as to why there are more returns in April than in any other month.

I would like to express my thanks to the National Park Service, particularly to Mr. E. Lowell Sumner, Jr., and Mr. E. T. Scoyen, who made my visits to the islands possible, and to the United States Coast Guard, whose cutters transported us and whose officers and men assisted us in many ways, and to all those who reported banded birds.

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Note: Since this paper went to press, three additional returns from California have been received, as follows: Sunset Beach, Orange County, October 31, 1941; Palomar Mountain, San Diego County, November 15, 1941; and San Francisco Bay at Richmond, February 3, 1942. All were banded on May 15, 1940, and all were found dead.

Soil Conservation Service, Berkeley, California, February 17, 1942.

THE SONG SPARROWS OF THE VIRGIN RIVER VALLEY, UTAH

By JOE T. MARSHALL, JR., and WILLIAM H. BEHLE

Study of a series of Song Sparrows (*Melospiza melodia*), recently collected in Washington County, Utah, has brought to light one more case of racial differentiation in this exceedingly variable species. Correlated with this differentiation is a significant ecological separation of populations of Song Sparrows in southwestern Utah. The specimens of the series are easily separable into two distinct groups. Those taken from stream-side thickets from 4200 to 6800 feet in the Pine Valley Mountains are dark, heavily streaked and apparently typical of *M. m. fallax*, whereas others collected at swamps 25 miles away at 2800 feet along the Virgin River near Saint George are of a conspicuously lighter brown color and also lack the black streaks on the feathers of the dorsum which are so characteristic of *fallax*. These features suggest an approach to the race *saltonis*, yet the Virgin River Valley birds are darker than those of *saltonis*.

While the Song Sparrows of the Virgin River Valley are thus intermediate in certain respects between *fallax* and *saltonis*, several circumstances argue against the view that they constitute an intergrading population. Although the Virgin River series exhibits the wide range of individual variation characteristic of Song Sparrows as a whole, there is, nevertheless, closer agreement among individuals of the group in their color characters than there is in comparable series of many other races. In addition, they exhibit a small range of variation in wing length. These features suggest a racial stock of relatively uniform genetic constitution, which view is strengthened when one considers the wide range of variation in *saltonis-fallax* intergrades, where the ranges of these two races adjoin. For instance, five breeding and two fall-taken adults from Cochise and Santa Cruz counties, Arizona, which we have examined (also reported by Swarth, Proc. Calif. Acad. Sci., ser. 4, 18, 1929:329) vary in wing length from below average for *saltonis* to a value extremely high for *fallax*. One breeding female in contrast to the others has conspicuous black dorsal streaks. The dorsal ground color of one specimen is grayish. Another has a back typical of *saltonis*. The rest have an intensification of the bright reddish-brown of *saltonis*, rather than the subdued chestnut color of the Virgin River birds. The lack of resemblance of the Virgin River series to these highly variable intergades might be taken as evidence that the Virgin River Valley birds are not themselves intergrades.

The uniformity of the Virgin River population may be explained in part by its being more or less isolated from surrounding races. Between it and *saltonis* to the south lies a great desert country with infrequent oases. Even though the Virgin River is a tributary of the Colorado River, there is, for the most part, an absence of suitable Song Sparrow habitat, especially in regions below Boulder Dam where the Colorado River cuts through narrow gorges and has little or no stream-side vegetation along its course. The Virgin River population is in closer geographic proximity to *fallax* but is separated from that form to some extent by prevailing desert conditions and by lack of suitable habitat. There is seemingly an ecological separation, in addition, between the two races.

Indications are that the Virgin River Song Sparrows occur only in the vicinity of cattail swamps with standing water and with bushy thickets such as mesquite or rose in the immediate dry-land surroundings. Both the thickets and the cattails are frequented by the Song Sparrows, the latter being resorted to especially for greater protection. The breeding specimens from Zion Canyon, from south of Saint George, and from Pahranagat Valley were taken in such a habitat. Bird associates are Marsh Wrens, Yellow-throats, Yellow Warblers, and Red-winged Blackbirds. Extensive field work

along the Beaver Dam Wash, the lower Santa Clara Creek, and the Virgin River has failed to reveal Song Sparrows in stream-side thickets. The swamps where these birds do occur are few in number and widely scattered. If the swamps are of any extent at all, Song Sparrows are numerous in them, but the total racial population can not be great. This spotty distribution of suitable swampy habitat not only makes for isolation from *fallax* but also makes for discontinuous distribution of the colonies within the general range of the race. The Virgin River Song Sparrows exist in an area characterized by "Lower Sonoran" conditions as shown by the presence of such indicator species as the catclaw (*Acacia greggi*), mesquite (*Prosopis glandulosa*), screwbean (*Strombocarpa odorata*), desert willow (*Chilopsis linearis*), creosote bush (*Covillea tridentata*), and bur-sage (*Franseria dumosa*) in the general region.

In contrast to the ecological situation of the lowland population, the nearest examples of *fallax* were taken at the Danish Ranch, 4200 feet, five miles northwest of Leeds, and near the hamlet of Pine Valley, 6800 feet, some 17 and 23 miles away. At both these collecting stations the Song Sparrows were taken from dense stream-side thickets of willows and hawbush along streams running through wet meadows. Also occupying the thickets were Lazuli Buntings and Yellow Warblers. Occasionally, Brewer Blackbirds and Red-wings come to the thickets, although these latter species are found, for the most part, associated with the wet meadows of grasses and sedges. The Song Sparrows under these conditions are more widely spaced and less concentrated than in the lowlands. Probably the Song Sparrows of the *fallax* group are relatively tolerant as to habitats frequented, for farther north in Utah they exist also near swampy areas.

The general environmental situation occupied by *fallax* in Washington County, Utah, can be summed up by saying that they occur in "Great Basin" or "Upper Sonoran" type of country characterized by sage brush of various species (*Artemisia*), rabbit brush (*Chrysothamnus*), shadscale (*Atriplex confertifolia*) and other shrubs of the northern desert shrub association. Another characteristic vegetative feature of the region is the juniper-piñon pine association. Although the Song Sparrows do not associate directly with any of these vegetative types, the presence of these forms indicates a different ecological situation where *fallax* occurs as compared with the lowland Virgin River Valley situation.

Yet another consideration bearing on the status of the Virgin River Valley population is the indication of a definite, fairly extensive breeding range.

In view of the uniformity of characters of the Virgin River population, its distinct color and size characteristics, and its ecological and spatial isolation from *fallax* and *saltonis*, respectively, we regard it as representing a distinct race.

Melospiza melodia virginis, new subspecies. Virgin River Song Sparrow.

Type.—Adult male, no. 6534, Univ. Utah Mus. Zool.; taken near junction of Virgin and Santa Clara rivers, 3 mi. S Saint George, 2800 feet, Washington County, Utah, May 16, 1940; collected by William H. Behle, orig. no. 2091.

Subspecific characters.—Differs from *M. m. fallax* in having the centers of shaft streaks of the scapulars and interscapulars and breast spots brown rather than black. Crown not streaked with black. Dorsal ground color light brown rather than gray. Closer in general color tone to *saltonis* but differs in having breast spots, back and crown darker, more of a chestnut brown rather than the bright reddish brown of the southern race. In comparing series rather than individuals, the sides of the head and neck of the new race show a grayer appearance than *saltonis*, the mass effect being due largely to the whiter superciliary stripe of *saltonis*. Sexual dimorphism is similar to that of *saltonis* in that females have darker streaks than males. As to wing length, *virginis* is intermediate between *saltonis* and *fallax*.

Extreme and average measurements of M. m. virginis.—Eleven males, wing 64.2-68.0 (66.1), tail 66.7-72.3 (69.3), bill from nostril 7.9-8.8 (8.4), tarsus 20.8-22.7 (21.2) mm. Nine females, wing 62.0-67.4 (64.0), tail 65.4-73.3 (67.7), bill from nostril 7.9-9.0 (8.4), tarsus 20.1-21.9 (20.8) mm. Type, male, wing 65.4, tail 69.5, bill from nostril 8.8, tarsus 22.0 mm.

Extreme and average measurements of M. m. fallax.—Twenty males, wing 65.3-72.2 (69.0), tail 65.5-77.1 (70.0), bill from nostril 7.5-9-5 (8.4), tarsus 20.9-23.5 (22.2) mm. Nine females, wing 64.2-67.8 (66.2), tail 64.1-69.9 (67.4), bill from nostril 8.4-9.0 (8.6), tarsus 20.8-22.7 (21.5) mm.

Extreme and average measurements of M. m. saltonis.—Twenty males, wing 63.0-67.5 (65.2), tail 65.0-72.4 (68.4), bill from nostril 7.6-9.1 (8.4), tarsus 19.8-22.8 (21.3) mm. Twenty females, wing 58.7-64.0 (61.4), tail 58.3-67.4 (64.1), bill from nostril 7.6-9.5 (8.4), tarsus 19.6-21.9 (20.7) mm.

Geographic distribution.—Breeds in the valley of the Virgin River, Washington County, Utah (16 breeding specimens), including Zion Canyon (2 breeding specimens) and zonally equivalent habitat west at least to Pahranagat Valley, Lincoln County, Nevada (2 breeding specimens).

Winters south along the Colorado River from the southern tip of Clark County, Nevada, to San Bernardino County, California (13 winter specimens).

The time of departure and the completeness of the winter exodus of *virginis* from its breeding range as well as the fact of replacement in winter of the summer resident population by individuals from farther north is indicated by the fact that less than half of 20 specimens collected at the type locality in mid-September represent the breeding population. The others were *fallax* which probably wandered down into the lowlands from near-by higher areas. Also, of 30 skins collected in the vicinity in mid-December, all but two are *fallax*. The other two show an approach to *merrilli*.

Intergradation between *virginis* and *fallax* is suggested by one skin of the lot of 6 collected near the hamlet of Pine Valley, Pine Valley Mountains, which shows an approach in its coloration to the new race. The others are uniform in characters and are allocated to *fallax*. A specimen from Lehman Creek, 7500 feet, White Pine County, Nevada, has something of the general color of *virginis* but is of the size of *fallax*. Yet another skin from Greenmonster Canyon, Monitor Range, Nye County, Nevada, although badly worn, shows some of the chestnut color of *virginis* on the back.

This study has involved scrutiny of skins not only from the collections of the University of Utah and the Museum of Vertebrate Zoology but also from the Museum of Northern Arizona, the California Academy of Sciences and the collection of Ralph Ellis, Jr. To the owners or custodians of these collections we express our thanks.

Museum of Vertebrate Zoology, Berkeley, California, and *Department of Biology, University of Utah, Salt Lake City, December 26, 1941.*

FROM FIELD AND STUDY

Flight Behavior of Young Chimney Swifts.—On August 12, 1941, several families of Chimney Swifts (*Chaetura pelagica*) left their nests which were situated in a large dummy chimney near my office. Previously I had heard the young birds twittering at intervals throughout the day, presumably whenever they were fed by the adults. However, on the morning of August 12 a more or less continuous twittering came from the chimney until 10:15 a. m., at which time it ceased rather abruptly. Opening a trapdoor in the roof, I counted twenty-two swifts circling around the building. Returning to my work, I was startled a few minutes later by the entrance of a swift through the trapdoor, which had been left open. The bird was examined, marked with India ink, and released. Within four or five minutes another bird made its entrance and was treated in much the same manner. During the morning six birds, all young, dropped through the trapdoor; there were no repeats. After the third descent, I gave up trying to get any work done and stationed myself below the opening in order to observe, if possible, the manner of entrance. In the three examples seen, the birds hovered briefly immediately above the opening before dropping or "flapping" through tail first.

It appears that the young birds, attempting to return to the chimney, presumably for a rest, mistook the open trapdoor for the chimney top. None flew back out; five flew across the room to flutter against a window. The sixth hung up on the wall near the point of entrance.

In observing these birds, my attention was caught by the apparent periodicity of alternating activity and quiescence. It seemed almost as though seven or eight wing beats tired the bird and necessitated a rest of from three to five seconds. The same periodicity was noted for the flight of the birds above the roof.

Although none of the birds uttered a sound when handled, all seemed to display a definite fear reaction.—DONALD M. HATFIELD, *Chicago Academy of Sciences, Chicago, Illinois, January 23, 1942.*

The Black Tern in Western Washington.—So far as I am aware Edson's record of a Black Tern (*Chlidonias nigra surinamensis*) (Auk, 25, 1908:429) taken August 26, 1899, at the Nooksack Marsh, Bellingham Bay, has remained unique in the ornithological literature of western Washington. However, Frederick C. Lincoln (letter of December 9, 1941) states that there is in the Fish and Wildlife Service files "a migration card (unpublished) sent in by Rufus Comstock, of Vancouver, under date of June 7, 1936, which contains the note that 'It [the Black Tern] is seen here nearly every year during high water about June 1.'" Accordingly a spring sight record and the collection of a fall specimen, both at Waughop Lake near Steilacoom in Pierce County, 110 miles south of the Bellingham locality and an equal distance north of Vancouver, seem worthy of notice.

Waughop Lake is a small, shallow, muddy lake lying near the northern edge of the "prairie country," a mile or less inland from the waters of southern Puget Sound. Mrs. J. H. Kitler, an enthusiastic and competent bird student of Tacoma, has reported to me that on May 17, 1938, she visited this lake and there observed a full-plumaged, adult Black Tern, conspicuous with its blackish body and pearl gray wings, flying about over the water. She is uncertain as to the exact number present, but at least the one was positively identified and entered in her notes for the day. The fall record is based on a specimen (no. 1017) in my collection, a juvenal male which I collected September 15, 1941, as it flew over the lake with a number of Bonaparte Gulls (*Larus philadelphia*) and Common Terns (*Sterna hirundo*). For permission to collect on the lake, which is included within the boundaries of the Western State Hospital grounds and the Pierce County Game Reserve, I am indebted to Dr. William N. Keller, Superintendent, and Mr. A. P. Wertman, Livestock Manager, of the hospital; and to Mr. Charles M. Morrell and Mr. J. M. Hynes of the Washington State Game Department.

Some interest may attend a comparison of the western Washington records with those of the adjoining parts of British Columbia and Oregon lying west of the Cascade mountain system. Brooks and Swarth (Pac. Coast Avif. No. 17, 1925:29) list the species as rare in spring and fall at Sumas Lake, B. C., on the authority of Brooks, and discount an early record for Burrard Inlet "as the date given (January) is an extremely unlikely one for the Black Tern to occur in this latitude." For western Oregon I have only the two following records at hand: Lincoln (*loc. cit.*) states that in the National Museum there is a specimen of Black Tern collected in July, 1836, in the Willamette Valley by J. K. Townsend; and Einarsen (Murrelet, 19, 1941:22) has recorded visitations in August of 1936, 1937, and 1938 of from 1 to 20 adult Black Terns to an artificial pond 6 miles north of Corvallis. Summarizing, it may be stated that probably throughout the Puget Sound-Willamette Valley trough, lying west of the Cascade Range, the Black Tern is rare as a spring (May)

and fall (August-September) migrant, apparently summering occasionally at points in the Willamette Valley.

As a matter of record it may be noted that the specimen constituting the basis of the early record for Bellingham Bay is still in Mr. Edson's possession, and, like that collected at Tacoma, is in juvenal plumage (Edson, letter of December 23, 1941).—JOHN W. SLIPP, *University of Washington, Seattle, January 6, 1942.*

The Use of Duck Feathers by Nesting Marsh Wrens.—The Western Marsh Wren (*Telmatodytes palustris plesius*) nests commonly in the Cariboo region of British Columbia and in the summer of 1941 many nests were examined in the marshes near Springhouse. It was observed that duck feathers were conspicuous on the outer surface of many nests and evidently formed an important constituent of the nest material.

One unoccupied nest was collected and later taken apart. It was found to contain 491 teleoptile feathers; the longest, chiefly flank feathers from male Mallards, averaged 85 mm. in length. In addition there was a large amount of duck down. The feathers and down combined represented about one-third of the total material in the nest, the balance being dry *Scirpus* stems and *Carex* stems and leaves. The feather material was not used as a lining but had been worked into the fabric of the nest.

As to the source of the material, these marshes are retreats for molting male ducks and during July every muskrat house or other prominence used as a resting place by the ducks is strewn with quantities of feathers.—J. A. MUNRO, *Okanagan Landing, B. C., January 28, 1942.*

A New Species of Crane from the Pliocene of California.—Recently the Museum of Paleontology of the University of California has made excavations in search of fossils in Pliocene deposits at Black Hawk Ranch situated at the southern base of Mount Diablo, Contra Costa County, California. Stirton (Univ. Calif. Publ. Bull. Dept. Geol. Sci., 24, 1939:341) writes of this locality as follows: "Fossils found on spur just above saddle in sandy and clayey conglomerate with some volcanic ash." A beaver of the genus *Eucastor* was found in this quarry, indicating that the formation is of late Lower Pliocene age (Stirton, *op. cit.*:343).

The remains of birds from this locality are badly crushed and most of them are so altered that they can not be identified generically. Only one bone, a distal end of a tarsometatarsus, is sufficiently well preserved to permit detailed study. This specimen represents a large crane, heretofore unknown, which may be named

Grus conferta new species

Characters.—Similar to *Grus canadensis*, but differs as follows: articular surface of inner trochlea of tarsometatarsus much flatter and its plane more nearly transverse to axis of bone; this surface curves smoothly and extensively on to medial side of metatarsal II in *G. canadensis* and *G. americana*. Inner trochlea of fossil relatively thicker mediolaterally. Second metatarsal extends farther distally, relative to third, in *conferta* and *canadensis* than in *americana*. Size of *conferta* like that of *americana*.

Type.—Distal end of left tarsometatarsus (see fig. 50), no. 34715 Univ. Calif. Mus. Paleo.,

Fig. 50. Distal ends of left metatarsi of cranes. Outline at left, anterior view of *Grus canadensis tabida*, no. 40455, Mus. Vert. Zool. Center and right, anterior and medial views of type of *Grus conferta*, no. 34715, Univ. Calif. Mus Paleo. Dissimilarities in trochlea IV result from crushing of fossil. (Drawings by Viola Memmler.)

from Black Hawk Ranch Quarry, locality no. V-3310, Lower Pliocene, Contra Costa County, California (for further details of locality, see Stirton, *op. cit.*, fig. 94).

Measurements in millimeters.—Width of middle trochlea, 10.1; transverse diameter of inner trochlea, 8.0.

Remarks.—The shape of the articular surface of the inner trochlea in the fossil species would cause the inner toe to lie closer and more nearly parallel to the middle toe than in modern *Grus*. This would result in a less widespread tripod of toes and probably in less secure footing. No members of the Gruidae have been reported from North America between the Eocene and the Pliocene. The fossil cranes of the Pliocene and Pleistocene have all been placed in *Grus*, and indeed much of the material has been allocated to the living species, *Grus canadensis* and *Grus americana*. *Grus minor* L. H. Miller and *Grus haydeni* Marsh have been relegated to the synonymy of *Grus canadensis* (Wetmore, Smithsonian Misc. Coll,. 99, 1940:50). The extinct species from the later geologic record that are recognizably different are *Grus proavus* (Marsh, Amer. Jour. Sci., ser. 3, 4, 1872:261) from the Pleistocene of New Jersey, and *Grus nannodes* (Wetmore and Martin, Condor, 32, 1930:62) from the middle Pliocene of Kansas. The tarsometatarsi of these species are not known, but both these cranes were smaller than *Grus canadensis* and hence much smaller than *conferta*.

The arrangement of the articular surface of the inner trochlea in *conferta* might seem to be more generalized and primitive than in other members of the genus *Grus*. For this reason special search for evidence of this condition among fossil gruids has been made. Unfortunately in few of these is this part of the metatarsus preserved and figured. *Aletornis nobilis*, although from the Eocene, apparently was like *G. canadensis* and not like *conferta* in this respect (see Shufeldt, Trans. Conn. Acad. Arts Sci., 19, 1915: pl. 2, fig. 15, pl. 6, fig. 43). The drawing of *Pliogrus pentelici* (Gaudry, Bull. Soc. Geol. France, ser. 2, 191, 1862:633, figs. 8-11) shows a less rounded articular contour than in *Grus*, but the description points out especially that this trochlea permits considerable medial separation of the second toe from the others. Whatever the exact condition, the trochlea in this species from the Pliocene of Greece must have been more like *Grus canadensis* than like *G. conferta*. *Grus melitensis* (Lydekker, Proc. Zool. Soc. London, 1890:408-409, pl. 36, figs. 2, 2a) from the Pleistocene of Malta shows a flatter articular surface than in the modern *Grus antigone*, which is also figured, but not nearly so flat as in *conferta*. In other respects, *melitensis* appears rather aberrant and it may not be properly placed in *Grus*. Thus the principal distinguishing feature of *conferta* can not through comparison with other fossils be proved primitive nor does it indicate close connection with other forms. Probably *conferta* was as distinct from typical *Grus* as was *Pliogrus*, which has been separated by Lambrecht (Handbuch Palaeorn., 1933:522) on the basis of characters of the distal end of the tibiotarsus. However, *conferta* is so remarkably like typical *Grus* in most respects that its fundamental similarity should not be obscured by separating it generically. —Alden H. Miller and Charles G. Sibley, *Museum of Vertebrate Zoology, Berkeley, California, February 15, 1942.*

Records from Extreme Northeastern Nevada.—A brief collecting trip with Mr. Cecil S. Williams through the Raft River and Grouse Creek Mountains of extreme northwestern Utah terminated at the McCuistion ranch on the west base of Pilot Peak on September 20, 1941. The Pilot Range, including Pilot Peak, is almost entirely within Utah, although the Utah-Nevada boundary runs close to the base of the peak and the McCuistion ranch, about 2 miles west of this boundary, is in Elko County, Nevada, south and east of Montello.

Pilot Peak, famous as a landmark for early emigrants traveling westward over the Great Salt Lake Desert, stands like a giant pinnacle or torch in the heart of the great western desert. This well-timbered, 10700-foot mountain is undoubtedly a concentration point for migrant birds, and the few watered areas and ranches at the base of the mountain are teeming with birds during the period of migration.

On September 19 the weather had been stormy and cold, the mountain being covered with a blanket of snow above the 5000-foot contour. This forced the late migrants off the mountain, so that on September 20 the McCuistion ranch abounded with birds.

In about two hours on the morning of September 20 the writer and Mr. Williams collected one bird that appears to be new to Nevada's avifaunal list, as well as other specimens sufficiently uncommon in the state to merit reporting. Northern Pileolated Warblers (*Wilsonia pusilla pileolata*) were abundant, and three specimens were collected; with them, however, was collected one specimen that was later determined to be *Wilsonia pusilla pusilla*, a bird apparently new to the avifaunal list for this state. Dr. H. C. Oberholser confirmed this identification.

Of the water birds, two Eared Grebes, one Coot, and a Killdeer were noted on or near a small artificial pond.

Obviously, a "vermin" campaign had recently been conducted in this area. Dead Sharp-

shinned, Cooper, Marsh, and Sparrow hawks were found on the ranch. The collectors also found a Golden Eagle, a Horned Owl (later identified as *Bubo virginianus occidentalis*), and a Long-eared Owl.

Two species of game birds—a flock of Sage Hens and the Western Mourning Dove—had found sanctuary at the McCuistion ranch.

Fifteen Lewis Woodpeckers (*Asyndesmus lewis*) (one of which was collected) and several Red-shafted Flickers were noted. It was interesting to find that, because of their effectiveness in controlling grasshoppers and crickets, a flock of about 200 American Ravens was encouraged around the farm.

In a small currant patch a single late migrant Sage Thrasher, two Ruby-crowned Kinglets, and an Orange-crowned, an Audubon, two Townsend, and several Tolmie warblers were noted. Unfortunately, neither the Orange-crowned nor the Audubon warbler was collected: specimens taken in near-by Utah proved to be *Vermivora c. celata, V. c. orestera, Dendroica a. auduboni,* and *D. a. memorabilis.*

It was surprising to find a Bobolink in this desert area. Western Meadowlarks, English Sparrows, Lazuli Buntings, House Finches, Pine Siskins, and Song and White-crowned sparrows were common.

In addition, one atypical Nevada Savannah Sparrow (*Passerculus sandwichensis nevadensis*) and one Lincoln Sparrow (*Melospiza lincolnii lincolnii*) were collected.—Clarence Cottam, *U. S. Fish and Wildlife Service, Washington, D. C., January 31, 1942.*

Black Pigeon Hawk Taken in Eastern Washington.—In a group of interesting predators recently sent to me in the flesh by Mr. Harold Witham, Superintendent of the State Game Farm at Kennewick, was a female Black Pigeon Hawk (*Falco columbarius suckleyi*). The bird was taken on or about December 23, 1941, at Finley, about 5 miles southeast of Kennewick in Benton County, Washington, and is now preserved as a study skin (no. 1000) in my collection. Data obtained during preparation are as follows: wt. 218 gm., but little fat; length, 12.6 inches; extent, 25.5 inches; wing, 215 mm.; ovary evenly fine-granular. So far as the information in my files goes there are no previous definite records of *suckleyi* in eastern Washington, although there are several for eastern Oregon (Gabrielson and Jewett, Birds of Oregon, 1940:204) and the Okanagan region of south-central British Columbia (Brooks and Swarth, Pac. Coast Avif. No. 17, 1925:58). Mr. Stanley G. Jewett (letter of January 3, 1942) indicates that this is also his impression and advises placing the Finley specimen on record.—John W. Slipp, *Department of Botany, University of Washington, Seattle, February 9, 1942.*

An Additional Note on English Sparrows Feeding on Ants.—In the Condor for November, 1935 (pp. 284, 285) Uhl R. Kuhn reports English Sparrows (*Passer domesticus*) feeding on ants, and considers this an unusual food habit of this species. Mr. Kuhn was fortunate in his opportunity of observing them feeding on ants that had just been uncovered. I would not venture to say to what extent this feeding habit may be unusual, for it would be easy to overlook birds picking up an ant here and there among grass and other vegetation.

Through an observation in the summer of 1940 at my home near McMillan, Luce County, Michigan, I can add another case of the English Sparrow feeding on ants. A female was coming often about the well, and I noticed her taking ants that were on the boards at that place. As the ants became scarce, the bird's trips to the spot decreased; the locality was soon deserted by the bird after a few trips had met in failure in finding ants.—Oscar McKinley Bryens, *McMillan, Luce County, Michigan, December 20, 1941.*

Food of the Barn Owl at Soda Lake, Nevada.—On February 22, 1941, the writer and Miss Laura E. Mills visited the north end of Soda Lake, Churchill County, Nevada. Here, in a south-facing vertical bank, Miss Mills had seen Barn Owls (*Tyto alba*) on several previous occasions. In the bank, less than thirty feet from the water's edge, we found an opening, about fifteen inches in diameter. Seven feet from the base, the hole went straight into the bank for about two feet, then made a ninety degree turn to the left and extended for about three feet farther. With the aid of a mirror placed at the turn, so as to reflect light into the hole, we could see an adult Barn Owl standing near the end of the burrow. Miss Mills had earlier in the day seen two Barn Owls fly from this location. Examination of the ground at the base of the bank below the opening revealed numerous pellets judged by us to have been ejected by the Barn Owls. A total of 89 that were reasonably fresh were picked up for study. Each of the 73 food items listed in the table was represented by the major part of a cranium.

Mammals	Number of items	Approximate per cent of total items
Ground squirrel, *Citellus townsendii* (*mollis*)	2	3
Pocket gopher, *Thomomys bottae* (*canus*)	20	34
Kangaroo rats, *Dipodomys* sp.	24	41
Dipodomys ordii (*columbianus*)	8	14
Dipodomys merriami (*merriami*)	2	3
Meadow mouse, *Microtus montanus* (*undosus*)	3	5
Total	59	100
Birds		
California Quail, *Lophortyx californica*	2	14.3
Virginia Rail, *Rallus limicola*	1	7.1
Brewer Blackbird, *Euphagus cyanocephalus*	11	78.6
Total	14	100

Parts of names in parentheses are assumed on the basis of other identified specimens collected in the vicinity.

I am grateful to Dr. Alden H. Miller and Harvey I. Fisher, of the Museum of Vertebrate Zoology, for identifying the remains of birds.—J. R. ALCORN, *Fallon, Nevada, February 20, 1942.*

Early Nesting of the Anna Hummingbird in Altadena, California.—On December 11, 1941, I found the nest of an Anna Hummingbird under construction; it was about one-quarter built. On December 17 the nest was apparently completed but contained no eggs. I did not examine the nest again until January 15, when I found two young birds in it. On January 15 I found a second nest which contained two young birds apparently more developed than those in the first nest.

These birds have survived frost, rain, and wind. On January 22, both broods of young seemed to be prospering.—WALTER I. ALLEN, *Altadena, California, January 22, 1942.*

Habits of Horned and Short-eared Owls.—That diurnal birds of prey are frequently carrion feeders has long been known. Similar habits are probably not unknown for several nocturnal species. On the road in Blitzen River valley, Harney County, Oregon, that borders the western side of the Malheur National Wildlife Refuge, one may find many jack rabbits that have been killed on the dirt highway by passing automobiles. Shortly after dusk on the evening of June 27, 1941, the writer observed four Horned Owls (*Bubo virginianus*) feeding on a freshly killed black-tailed jack rabbit (*Lepus californicus*) on the roadway. The following evening Messrs. Clarence Cottam, Cecil S. Williams, and the writer observed what may have been a family group of three Horned Owls feeding at about the same time and place on the carcass of a rabbit which had apparently been killed during the day.

On several occasions in the fall of 1941 the writer flushed a number of Short-eared Owls (*Asio flammeus*) from where they had been sitting on the above-mentioned highway in the vicinity of Saddle Mountain, just west of Unit 10 of the Malheur Refuge. A number of dead jack rabbits, killed by automobiles, were also observed along this stretch of road, and on the night of September 29 one of these owls was observed to fly across the road with a piece of jack rabbit clutched in its talons. Perhaps these birds also found this roadway a profitable hunting place for other prey, as mice were observed on a number of occasions out on the roadway.

Observations of these owls in the vicinity of the carcasses of the jack rabbits called to mind an observation made on September 22, 1938, when two Short-eared Owls, apparently juveniles, were seen going through what appeared to be practice maneuvers in capturing and killing their prey. These owls were observed to land on the carcass of a Redhead Duck (*Nyroca americana*) a number of times, with all the force they could muster. After landing on the carcass and sinking their talons into it, they would look around for a few seconds, fly a short distance away to another perch and survey their surroundings and then repeat the process. One owl struck the duck three times. They never attacked it with their beaks. The carcass of the duck was lying on a floating section of an old straw pile in the east end of a pond located in Unit 8 of the Malheur Refuge. It was known that these birds had not killed the duck, as it was spoiling and had been seen lying on the straw pile for several days.—CLARENCE A. SOOTER, *U. S. Fish and Wildlife Service, Burns, Oregon, November 6, 1941.*

A Note on the Western Robin in the Pasadena Area.—A recent observation by Robert T. Moore (Condor, 43, 1941:201) concerning the nesting of Western Robins (*Turdus migratorius propinquus*) near Pasadena prompts a further comment on the subject. In 1923, a pair of robins nested in a clump of shrubbery in the grounds adjoining the Donald Dickey residence near Brookside Park and were seen by Mr. Dickey and myself at frequent intervals throughout the summer. This is the first appearance in this vicinity as a breeding bird of which I am aware. Since 1933, from one to three pairs of robins have nested yearly on the grounds of Dr. Donald Skillen in Flintridge, where they have been seen by various people beside myself. It thus appears that the robin is firmly established in the Pasadena area, although, as yet, in rather limited numbers and confined chiefly or entirely to districts of extensive lawns. Generally speaking, it may be said that the transition of Pasadena from a small farming community to a residential city took place in the late 1890's and the early 1900's. It was thus about twenty-five years from the establishment of suitable territory until the robins first made use of it, although the species has always been common in summer in the Transition Zone in the immediately adjacent mountains.—A. J. VAN ROSSEM, *Dickey Collections, University of California, Los Angeles, California, December 1, 1941.*

Poor-will at Bellingham, Washington.—Last October the body of a Poor-will (*Phalaenoptilus nuttallii*) was found by Miss Zella McMannama on the highway about six miles north of Bellingham. It was in a mutilated condition but a number of tail and wing quills were retrieved and brought to the writer, who in turn submitted them to the Fish and Wildlife Service for critical examination. As a result of investigations, Dr. John W. Aldrich writes as follows under date of November 13, 1941: "I have compared these quills very carefully with the specimens in our collection and find that they match most closely specimens of the dark phase of the race *nyctophilus* with which they may be tentatively identified. This form was described by Oberholser . . . from the Warner Valley region of Oregon. Your specimen . . . . as far as I know . . . is the only record of a Poor-will from west of the Cascades in Washington, although there is one record for the species, identified as *Phalaenoptilus nuttallii nuttallii*, by Grinnell, taken by Alex Walker at Netarts, Tillamook County, Oregon" (Condor, 36, 1934:178; see also Miller, Condor, 43, 1941:260).—J. M. EDSON, *Bellingham, Washington, December 11, 1941.*

Records of the American Brant and European Widgeon at Tule Lake, California.—On October 20, 1941, a specimen of the American Brant (*Branta bernicla hrota*), was taken on the Tule Lake Wildlife Refuge in Siskiyou County, California. This appears to be the second record of the American Brant in California. The first specimen was reported by H. C. Bryant (Condor, 16, 1914:183) as found January 30, 1914, near Bird Island on Arcata Bay, Humboldt County, California. I have found no additional records, other than reports referring to this first goose.

I acquired the specimen from Tule Lake from a hunter, who shot into a flock of Cackling Geese and brought down this brant together with two cacklers. The brant, an adult male, was in excellent condition and fine plumage. It is interesting to note that it was flying inland and not on the coast, which is the usual migration route for the Black Brant.

A European Widgeon (*Mareca penelope*) was obtained at the Tule Lake Refuge on December 13, 1941. It was shot and brought in by a hunter. The widgeon was a male and was in full plumage. This was the only specimen of this species taken during the hunting season and I believe the first one ever taken on the Tule Lake Refuge.—ED N. HARRISON, *Encinitas, California, March 9, 1942.*

NOTES AND NEWS

John T. Zimmer, of the American Museum of Natural History, has been elected Editor of the Auk to succeed the late Glover M. Allen. Mr. Zimmer brings to this post his extensive experience in publication, and we anticipate a high degree of efficiency and accuracy in the handling of the journal.—A.H.M.

We report with deep regret the passing of C. Hart Merriam and Vernon Bailey, both senior members of the Cooper Ornithological Club and distinguished for their work on birds as well as for their special eminence in the field of mammalogy.

There is a demand for information as to current wildlife research being conducted throughout the United States. In order to supply this the U. S. Fish and Wildlife Service will endeavor to assemble and release annually such information in condensed form. It is therefore suggested that you send before June 1, 1942, to the Fish and Wildlife Service, U. S. Department of the Interior, Washington, D. C., any titles of research problems upon which you may be working, with year of probable completion, and your name and address.—W. B. BELL, *Division of Wildlife Research.*

MINUTES OF COOPER CLUB MEETINGS

SIXTEENTH ANNUAL MEETING

The sixteenth annual meeting of the Cooper Ornithological Club was held Friday, April 3, to Sunday, April 5, 1942, at the Natural History Museum, Balboa Park, San Diego, California. Friday morning the meeting was opened with a welcome extended to members and visitors by Clinton G. Abbott, Chairman of the Local Committee. Howard Robertson, president of the Board of Directors, spoke in response for the visiting members of the Club.

After the annual business session, the following papers were presented: Some observations on birds harboring blood parasites, by Sherwin F. Wood; Territoriality and related problems in hummingbirds, by Frank A. Pitelka (read by title only); Succession in the cathartid dynasty, by Loye H. Miller (read by title only); State scientific collecting permits, by Clinton G. Abbott; The birds of the piñon association in the Death Valley region (illustrated with slides), by Alden H. Miller; Some birds as possible carriers of disease among the giant cacti (illustrated with slides), by Elizabeth S. Arnold.

Friday afternoon: Life history of the red-bellied hawk (a Kodachrome motion picture), by James B. Dixon; The white pelicans of Clear Lake, Modoc County, California (a Kodachrome motion picture), by Ed N. Harrison and Frances Roberts; Sex recognition in valley quail, by John T. Emlen, Jr.; Studies on the life-history and distribution of the phainopepla (illustrated with slides), by James E. Crouch; Weight-carrying capacity of eagles (illustrated with slides), by Lewis W. Walker; Some recent bird records from the lower Colorado River Valley (illustrated with slides), by Lee W. Arnold; To the tip of Lower California (illustrated with slides), by Frank F. Gander; Sierra birds and their nests (a Kodachrome motion picture), by James B. Dixon).

Saturday morning: Movements of immature gulls (from records of the Pacific gull color-banding project), by Grace Sargent; The story of the African peacock (*Afropavo*) (illustrated with slides), by T. D. A. Cockerell; Color shots at owls and herons (illustrated with slides), by Lewis W. Walker; Home life of the broad-tailed hummingbird (a Kodachrome motion picture), by Wilmatte P. Cockerell; Birds of an inland lake (a Kodachrome motion picture), by Ed Harrison and Frances Roberts; the western grebe: a life history contribution (a Kodachrome motion picture), by Stanley G. Jewett.

In the afternoon members and their friends were guests of the San Diego Zoological Society. At 2 p.m. the group met in the grounds of the Zoological Park and were accorded greetings by Mrs. Belle J. Benchley, Executive Secretary of the Zoological Society. The entire afternoon was devoted to enjoyment of the wonderful collection of animal life assembled there.

On Saturday evening, approximately 75 members and guests attended the annual dinner in the Gold Room, at the U. S. Grant Hotel. Ed Harrison and Frances Roberts presented their excellent new Kodachrome motion picture, "Birds of the Pacific Coast." In addition, members were particularly fortunate in being able to hear anecdotes and highlights on early days of the Cooper Ornithological Club from two of the founders, Harry R. Painton and Wilfred H. Osgood.

On Sunday, very enjoyable visits were made to the homes and museums of Ed Harrison at Encinitas and James B. Dixon at Escondido. Also fine opportunities for observation of aquatic birds were afforded at Lake Hodges, Mission Bay, and Buena Vista Lagoon, Carlsbad.—JACK C. VON BLOEKER, JR., *Secretary, Southern Division.*

ANNUAL BUSINESS MEETING

The business session was called to order in the lecture hall of the Natural History Museum, Balboa Park, San Diego, California, at 9:30 a.m., Friday, April 3, 1942, with President Howard Robertson in the chair and George Willett acting as Secretary.

The minutes of the 1941 Annual Meeting were read and approved.

The Chairman appointed as a committee to examine proxies, Laurence M. Huey, Chairman, Irwin D. Nokes and Walter Richardson, and as a committee to present nominations for Directors for the ensuing year, Clinton G. Abbott, Chairman, Joseph Dixon, Ed N. Harrison, Stanley G. Jewett and George G. Cantwell.

The meeting then adjourned to meet in the same room at 9:30 a.m., April 4, 1942.

The business session was resumed at 9:30 a.m., Saturday, April 4, 1942, in the lecture hall of the Natural History Museum, Balboa Park, San Diego, California, with President Howard Robertson presiding.

The Proxy Committee reported that, of a total membership of 876, 40 members were present in person and 414 were represented by proxies. The Chairman therefore declared a quorum present.

The Secretary reported election by the two divisions of the Club since the last Annual Meeting of 52 members, from and including Number 1230 on the Club Membership Roster, to and including Number 1281 on said roster. On motion by George Willett, seconded by Joseph Dixon and duly carried, the election of these members was ratified.

The Nominating Committee presented the following nominations for Directors for the ensuing year: John S. Appleton, W. Lee Chambers, Hilda W. Grinnell, Jean M. Linsdale, Alden H. Miller, J. R. Pemberton, Howard Robertson, John McB. Robertson and George Willett. On motion by Eric C. Kinsey, seconded by Louis B. Bishop and duly carried, the nominations were closed and the nominees declared elected.

The meeting adjourned at 9:40 a.m.—GEORGE WILLETT, *Secretary*.

NORTHERN DIVISION

FEBRUARY.—The regular monthly meeting of the Northern Division of the Cooper Ornithological Club was held on Thursday, February 26, 1942, at 8:00 p.m., in Room 212 Wheeler Hall, University of California, Berkeley, with Vice-president R. M. Bond in the chair and about 40 members and guests present. Minutes of the Northern Division for January were read and approved. There was one proposal for membership: Jack Chalmers Culbreath, 2412 Channing Way, Berkeley, by Seth B. Benson.

Field notes were numerous. Mrs. Kelly had made particular note of a Pileolated Warbler in Alameda on February 24, only to find that her neighbor, a reliable observer, could report one present all winter. Mrs. Sheldon described a case of partial albinism in a Red-winged Blackbird seen at the Berkeley Aquatic Park. She had seen a Black-necked Stilt and hundreds of Avocets at Dumbarton Bridge on February 22. Milton Seibert reported an Allen Hummingbird in Oakland on February 9, while Mr. Harwell could give February 6 as the date of an observation at Woodside, San Mateo County. Mr. Seibert also told of finding the nest of a Golden Eagle, with eggs, near Livermore. Mr. Bond had found six White-tailed Kites in Ventura County; one pair was beginning nesting activities. Numbers of Band-tailed Pigeons were reported by several observers in different localities.

Mrs. Grinnell quoted a letter from Dr. Parkinson of Estates Drive, Piedmont, reporting 30 or 40 Band-tailed Pigeons in the pines; they suddenly increased to 70 on February 14. Mrs. Allen reported that Forster Terns had been here all winter, 5 to 7 being seen at the Aquatic Park; they are usually fewer in number.

Introducing his talk on Birds of the Kings Canyon National Park, Mr. Joseph Dixon showed a choice collection of Kodachrome slides, illustrating the ecology of the region. The area is peculiarly lacking in records, and is critical as a meeting place of forms from southern California with Sierran forms from Yosemite.

Adjourned.—FRANCES CARTER, *Recording Secretary*.

SOUTHERN DIVISION

FEBRUARY.—The regular monthly meeting of the Southern Division of the Cooper Ornithological Club was held on Tuesday, February 24, 1942, at 8:00 p.m., in Room 145, Allan Hancock Foundation, Los Angeles, with President Sherwin F. Wood in the chair and 39 members and guests present. Minutes of the Southern Division for January, 1942, were read and approved. The following applications for membership were read: John W. Aldrich, Fish and Wildlife Service, Washington, D. C., proposed by John McB. Robertson; Jack Craig Couffer, 1625 Country Club Drive, Glendale, Calif., proposed by Jack C. von Bloeker, Jr.; Clyde Farson, 1422 Norton Avenue, Glendale, Calif., proposed by Walter W. Bennett; Samuel W. Gadd, 1331 N. Weber St., Colorado Springs, Colo., proposed by Mrs. N. Edward Ayer; and Mrs. Margaret P. Mahan, 4127 West 62nd St., Los Angeles, Calif., proposed by Hildegarde Howard.

President Wood announced that because of the Annual Meeting of the entire club to be held in San Diego, April 3 to 5, there will be no March meeting of the Southern Division.

It was announced that the Hancock Foundation is glad to be able to coöperate with the Cooper Club and that the matter of the fee for the use of the meeting room has been taken care of. This information met with unanimous approval.

President Wood then introduced the speaker of the evening, Dr. Arthur T. Harris, of Laguna Beach, California, whose subject was "The Nesting Habits of Some Indiana and California Birds." The topic was illustrated with a fine collection of Kodachrome slides.

Adjourned.—JACK C. VON BLOEKER, JR., *Secretary*.

OFFICERS AND MEMBERS
OF THE
COOPER ORNITHOLOGICAL CLUB,
INCORPORATED
Revised to April 25, 1942

OFFICERS OF THE CORPORATION

Howard Robertson.....President
Alden H. Miller.....Senior Vice-President
John T. Emlen, Jr.....Junior Vice-President
George Willett.....Secretary
Hilda W. Grinnell.....Assistant Secretary
John McB. Robertson.....Treasurer
W. Lee Chambers.....Business Manager
Alden H. Miller.....Editor
Jean M. Linsdale.....Associate Editor

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W. Lee Chambers — J. R. Pemberton
Hilda W. Grinnell — Howard Robertson
Jean M. Linsdale — John McB. Robertson
George Willett

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John T. Emlen, Jr.....Vice-President
Alden H. Miller.....Secretary

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Amelia S. Allen	Herbert N. McCoy
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Ralph Arnold	Alden H. Miller
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Louis B. Bishop	Robert T. Moore
R. M. Bond	I. D. Nokes
Harold C. Bryant	Wilfred H. Osgood
H. W. Carriger	Harry R. Painton
Frances Carter	J. R. Pemberton
W. Lee Chambers	Sidney B. Peyton
Herbert L. Coggins	Gayle B. Pickwell
Raymond B. Cowles	Guy C. Rich
Joseph S. Dixon	Howard Robertson
John T. Emlen, Jr.	John McB. Robertson
Walter K. Fisher	Tracy I. Storer
Hilda Wood Grinnell	E. Lowell Sumner, Jr.
Harry Harris	John G. Tyler
Hildegarde Howard	J. C. von Bloeker, Jr.
Eric Campbell Kinsey	George Willett
C. B. Lastreto	Sherwin F. Wood
Jean M. Linsdale	Curtis Wright
Luther Little	

DIVISION OFFICERS

NORTHERN DIVISION

E. Lowell Sumner, Jr.....President
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Hilda Wood Grinnell.....Corresponding Secretary

SOUTHERN DIVISION

Sherwin F. Wood.....President
I. D. Nokes.....Vice-President
Jack C. von Bloeker, Jr.....Secretary

MEMBERSHIP DIRECTORY

Year following address indicates date of election to membership. Year in parentheses indicates date of advancement to Honorary or Life Membership. [L.]=Life Member.

A

Abbott, Clinton G., Nat. Hist. Museum, Balboa Park, San Diego, Calif. 1921.
Adams, Mrs. E. L., 1712 Milan Ave., South Pasadena, Calif. 1936.
Adams, I. C., Jr., Maysville, Missouri. 1942.
Adams, Lowell, E-15 Liberty Ave., Spokane, Wash. 1939.
Albro, Miss Mary Stephanie, 51 Canyon Road, Berkeley, Calif. 1927.
Alcorn, Gordon D., Grays Harbor College, Aberdeen, Wash. 1942.
Alcorn, J. R., Rt. 1, Box 19A, Fallon, Nevada. 1939.
Aldrich, Elmer C., 6532 Pinehaven Road, Oakland, Calif. 1935.
Aldrich, John W., Fish & Wildlife Service, Washington, D. C. 1942.
Alexander, Miss Annie M., The Regillus, 19th and Jackson Sts., Oakland, Calif. 1908 (1923). [L.]
Alexander, Donald Child, 18 Hurd St., Lowell, Mass. 1939.
Alexander, Edward Gordon, Dept. of Biology, Univ. of Colorado, Boulder, Colo. 1919-21, 1941.
Allan, Philip Farley, 201 Arch Terrace, Amarillo, Texas. 1939.
Allen, Mrs. Amelia S., 37 Mosswood Road, Berkeley, Calif. 1913.
Allen, Dr. Arthur A., Fernow Hall, Ithaca, N. Y. 1911.
Allen, Walter I., 1751 North Pepper Drive, Altadena, Calif. 1922.
Alpert, Bernard, 170 Broadway, New York, N. Y. 1939.
Anderson, A. H., Rt. 5, Box 488, Tucson, Ariz. 1932.
Anderson, Dr. Rudolph M., Biol. Div. National Museum of Canada, Ottawa, Ontario, Canada. 1916.
Andrews, Arthur Allen, P. O. Box 199, Main Office, Rochester, N. Y. 1927.
Applegarth, John H., 2591 South Court, Palo Alto, Calif. 1937.
Applegate, Elmer I., Williams, Oregon. 1921.
Appleton, J. S., R.F.D., Simi, Calif. 1901 (1919). [L.]

Arnold, Dr. John R., Stockton Junior College, Stockton, Calif. 1930.
Arnold, Leroy Weight, 457 3rd St., Yuma, Ariz. 1929.
Arnold, Dr. Ralph, 812 Subway Terminal Bldg., Los Angeles, Calif. 1893.
Arthur, Mrs. Ernestine, 3200 Shattuck Ave., Berkeley, Calif. 1941.
Arvey, Martin Dale, Boise Junior College, Boise, Idaho. 1937.
Ashbaugh, Floyd Garfield, 1961 Eden Ave., Glendale, Calif. 1940.
Ashcraft, Granville Plummer, 3212 Watseka Ave., Palm Sta., Los Angeles, Calif. 1928-29, 1940.
Ashley, James F., 740 Santa Clara Ave., Alameda, Calif. 1933.
Atkinson, Dr. Spencer R., 65 N. Madison Ave., Pasadena, Calif. 1925.
Atkinson, W. L., 105 S. 14th St., San Jose, Calif. 1901.
Atsatt, Miss Sarah R., 405 Hilgard Ave., Los Angeles, Calif. 1911.
Austin, Mrs. Harold C., 541 Boulevard Way, Piedmont, Calif. 1939.
Austin, Oliver L., M.D., Tuckahoe, Westchester Co., N. Y. 1930.
Austin, Oliver L., Jr., Wellfleet, Cape Cod, Mass. 1933.
Austin, Paul G., 1508 N. Los Robles Ave., Pasadena, Calif. 1934.
Ayer, Mrs. N. Edward, 1300 Hillcrest Drive, Pomona, Calif. 1929.

B

Bach, Robert S., 600 Weatherly Bldg., Portland, Ore. 1937.
Badger, M. C., Rt. No. 1, Box 98, Santa Paula, Calif. 1915.
Bailey, Alfred M., Museum Nat. Hist., Denver, Colo. 1917.
Bailey, Florence M. (Mrs. Vernon), 1834 Kalorama Road, N. W., Washington, D. C. 1910 (1920) [L.] (1920) [Honorary].
Bailey, H. H., 820 Alhambra Circle, Coral Gables, Fla. 1903.
Bailey, Laura B. (Mrs. H. H.), 820 Alhambra Circle, Coral Gables, Fla. 1915 (1920) [L.]
Baker, John H., 1006 Fifth Ave., New York, N. Y. 1930.
Baker, William Hudson, Burns Union High School, Burns, Oregon. 1941.
Ball, Wm. Howard, 1861 Ingleside Terrace, Washington, D. C. 1926.
Ballard, Albert, 1326 Stanislaus St., Stockton, Calif. 1929.
Bamford, Mrs. G. L., 1428 Castro St., Oakland, Calif. 1918.
Barnes, Dale K., Graduate College, Princeton, N. J. 1939.
Barnes, R. Magoon, Lacon, Ill. 1908 (1921). [L.]
Barr, William F., 1606 53rd St., Oakland, Calif. 1938.
Barry, Miss Margaret A., 6928 Templeton St., Huntington Park, Calif. 1937.
Bartholomew, Paul S., 355 N. Loraine Ave., Glendora, Calif. 1939.
Bassett, Frank N., 722 N. Orange Drive, Los Angeles, Calif. 1919.
Batchelder, Chas. F., 7 Kirkland St., Cambridge, Mass. 1910.
Bates, Miss Josephine J., 240 E. Montana St., Pasadena, Calif. 1921.
Battles, Carroll David, 2347 S. Highland Ave., Los Angeles, Calif. 1924.
Baumgardt, John, 143 N. McCadden Place, Los Angeles, Calif. 1937.
Bayliss, Miss Julienne G., 1206 W. 70th St., Los Angeles, Calif. 1942.
Beach, Charles, Vail, Arizona. 1941.
Beck, Rollo H., Planada, Merced Co., Calif. 1894 (1919). [L.]
Beebe, William, 33 West 67th St., New York, N. Y. 1926.
Behle, Dr. William Harroun, Dept. of Biology, Univ. of Utah, Salt Lake City, Utah. 1933.
Bell, Archibald Weir, 365 S. Hoover St., Los Angeles, Calif. 1936.
Bello, Alice M. (Mrs. Victor), 617 Fifth Ave., San Rafael, Calif. 1937.
Belt, Bruce G., 2200 Live Oak Drive, Los Angeles, Calif. 1940.
Belt, Dr. R. Elmer, 1893 Wilshire Blvd., Los Angeles, Calif. 1942.
Bene, Frank, 1513 W. Garfield St., Phoenix, Ariz. 1940.
Benjamin, Gilbert G., Jr., 2297 W. 23rd St., Los Angeles, Calif. 1939.
Bennett, Logan Johnson, Penn. State College, State College, Pa. 1936.
Bennett, Walter W., 5617 Harcourt Ave., Los Angeles, Calif. 1934.
Benson, Dr. Seth Bertram, Museum Vertebrate Zoology, Berkeley, Calif. 1927.
Bent, A. C., 140 High St., Taunton, Mass. 1909 (1922) [L.] (1933) [Honorary].
Berry, Arthur L., 715 Orange Grove, Alhambra, Calif. 1942.
Bigelow, Homer L., The Farm, Windy Row, Peterboro, N. H., 1910.
Birkhead, Robert H., 1121 Kilson Drive, Santa Ana, Calif. 1928.
Bishop, Dr. Louis B., 450 Bradford St., Pasadena, Calif. 1904 (1920). [L.]
Blain, Dr. Alexander W., 2201 Jefferson Ave., Detroit, Mich. 1926.
Blanchard, Dr. Barbara D., Placer Junior College, Auburn, Calif. 1930.

Blanchard, Dean Hobbs, Box 111, Santa Paula, Calif. 1937.
Blanks, Herbert Beverly, Sequoia National Park, Calif. 1933.
Blayney, Miss Nita A., 920 O St., Fresno, Calif. 1911.
Blickensderfer, Clark, 866 Grant St., Denver, Colo. 1922.
Boggs, Ira Brooks, Oglebay Hall, Morgantown, West Virginia. 1940.
Bolt, Benj. F., 1110 E. Armour St., Kansas City, Mo. 1916.
Bond, Dr. Richard M., 2223 Fulton St., Berkeley, Calif. 1936.
Booth, Ernest S., Dept. of Biology, Walla Walla College, College Place, Wash. 1939.
Borell, Adrey E., Soil Conservation Service, Rt. 2, Box 600, Albuquerque, New Mexico. 1918.
Bosbyshell, F. H., 4414 Newport Ave., San Diego, Calif. 1940.
Boulton, Rudyerd, Field Museum, Chicago, Ill. 1939.
Boulware, Jean T., 2593 Life Sciences Bldg., Berkeley, Calif. 1939.
Bowdish, B. S., Demarest, N. J. 1910.
Boyer, Richard H., Rt. 1, Box 30, Fresno, Calif. 1941.
Boyle, Ashby D., 61 University St., Salt Lake City, Utah. 1915.
Bracelin, Mrs. H. P., 2214 Vine St., Berkeley, Calif. 1930.
Bradley, Mrs. Elizabeth, 527 Mountain View Ave., San Bernardino, Calif. 1938.
Braly, J. C., De Poe Bay, Ore. 1926.
Brandreth, Courtenay, Ossining, N. Y. 1925.
Brandt, H. W., 11945 Carleton Road, Cleveland, Ohio. 1914.
Breed, Lyman Walton, 2319 College Ave., Berkeley, Calif. 1942.
Brode, J. Stanley, Santa Monica Junior College, Santa Monica, Calif. 1934.
Brodkorb, Pierce, Museum of Zoology, Ann Arbor, Mich. 1940.
Brooks, Major Allan, Okanagan Landing, B. C., Canada. 1906 (1920) [L.] (1936) [Honorary].
Brooks, Prof. Sumner C., Dept. Zool., Univ. Calif., Berkeley, Calif. 1928.
Brooks, William E., 4008 N. 7th St., Phoenix, Ariz. 1940.
Brown, Asa L., Rt. 1, Box 259, Beaumont, Calif. 1938.
Brown, Harrison, Hornby Island, B. C., Canada. 1938.
Brown, Mrs. Lida Scott, 880 La Loma Road, Pasadena, Calif. 1934-37, 1940.
Brown, Miss Nellie May, 10361 Fernglen Ave., Tujunga, Calif. 1922.
Bryan, William A., 142 S. Hayworth Ave., Los Angeles, Calif. 1921 (1940) [Honorary].
Bryant, Dr. Harold C., Grand Canyon, Ariz. 1910 (1920) [L.].
Bryant, Monroe D., Museum of Vertebrate Zoology, Berkeley, Calif. 1939.
Bryens, Oscar McKinley, McMillan, Luce Co., Mich. 1927.
Buchanan, Miss Kathryn, 217 May Ave., Ft. Smith, Arkansas. 1937.
Buckalew, Herbert, 120 Marshall St., Milford, Del. 1936.
Buckman, George, 47 Bonnie Lane, Berkeley, Calif. 1927.
Budd, Edward, 2233 Channing Way, Berkeley, Calif. 1940.
Buhn, Mrs. Minnie, 2070 Charlene Ave., Hayward, Calif. 1921.
Bupp, Mrs. Mildred, 516 N. School St., Santa Maria, Calif. 1936.
Burleigh, Thomas D., Gulfport, Miss. 1918.
Burleson, Mrs. Donald, Box 262, Pacific Palisades, Calif. 1935.
Burnham, Dr. Clark, 853 Arlington Ave., Berkeley, Calif. 1907.
Burns, Frank L., Berwyn, Pa. 1909.
Burt, Dr. William Henry, Museum of Zoology, Univ. of Michigan, Ann Arbor, Mich. 1928.
Burtch, Verdi, Branchport, N. Y. 1910.

C

Cahalane, Victor H., Section on National Park Wildlife, Fish & Wildlife Service, Washington, D. C. 1938.
Cain, Brighton C., P. O. Box 796, Oakland, Calif. 1925.
Calder, James A., Buena Park, Calif. 1917.
Calder, Mrs. James A., Buena Park, Calif. 1926.
Camp, Dr. Charles L., Mus. Paleontology, Univ. Calif., Berkeley, Calif. 1909.
Campbell, Dr. Berry, Rockefeller Institute for Medical Research, New York, N. Y. 1930.
Campbell, Mrs. Wm. H., Twentynine Palms, Calif. 1940.
Cantwell, George G., 3602 Keystone Ave., Palms, Calif. 1915.
Carey, Josh Harlan, Hitchcock Hall, Univ. of Chicago, Chicago, Ill. 1936.
Carpenter, Mrs. Fred A., 1616 Sonoma Ave., Berkeley, Calif. 1930.
Carpenter, Nelson K., 5014 Westminster Terrace, San Diego, Calif. 1901.
Carriger, Henry W., 5185 Trask St., Oakland, Calif. 1895.
Carrighar, Miss Sally, Room 302, Montgomery Block, San Francisco, Calif. 1941.
Carter, Miss Frances, 2200 College Ave., Berkeley, Calif. 1934.
Cawelti, Wilfred E., 2526 Dwight Way, Berkeley, Calif. 1941.
Chadwick, Perley C., 426 W. Olive Ave., Redlands, Calif. 1939.

Chambers, Carl William, 514 Marquette St., Pacific Palisades, Los Angeles, Calif. 1936.
Chambers, W. Lee, 2068 Escarpa Drive, Eagle Rock, Calif. 1897 (1919) [L.] (1936) [Honorary].
Chapman, Dr. Floyd B., Fish & Wildlife Service, 1140 Park Square Bldg., Boston, Mass. 1941.
Chapman, Dr. Frank M., Amer. Museum Nat. Hist., New York, N. Y. 1903.
Chattin, Miss Susan E., Museum Vert. Zool., Univ. Calif., Berkeley, Calif. 1927.
Christensen, Glen, 513 University Ave., Reno, Nev. 1941.
Christy, Bayard H., 403 Frederick Ave., Sewickley, Pa. 1928.
Church, Charles T., 70 Pine St., New York, N. Y. 1940.
Clabaugh, Ernest Dwight, 44 Lenox Road, Berkeley, Calif. 1923 (1934). [L.].
Clark, Prof. Harold W., Angwin, Napa Co., Calif. 1925.
Clary, Mrs. Ben Little, Coral Reef Ranch, Coachella, Calif. 1929.
Clay, C. Irvin, Box 353, Eureka, Calif. 1910.
Cleary, Miss Sara Whitman, 2322 Shattuck Ave., Berkeley, Calif. 1941.
Clements, Wynona, 4023 Griffen Ave., Los Angeles, Calif. 1941.
Coble, Mary Ferguson, 3400 San Marino, Los Angeles, Calif. 1940.
Coggins, Herbert L., 1157 Filbert St., San Francisco, Calif. 1910.
Cogswell, Howard Lyman, 3807 Sierra Grande St., Pasadena, Calif. 1940.
Cohen, Donald A., 22728 Bay View Ave., Hayward, Calif. 1901.
Colburn, A. E., 3100 Wilshire Blvd., Los Angeles, Calif. 1905 (1915). [L.]
Cole, Elliot, Rt. 1, Box 74, Pasadena, Calif. 1929.
Coleman, Shirl, Bristol Silver, Nev. 1939.
Colton, Dr. Harold S., Museum of Northern Arizona, Flagstaff, Ariz. 1936.
Comby, Julius H., 256 N. Walnut St., Pico, Calif. 1939.
Compton, Lawrence V., Soil Conservation Service, Box 1354, Albuquerque, New Mex. 1927.
Comstock, Dr. John, Los Angeles Museum, Exposition Park, Los Angeles, Calif. 1936.
Cone, Hutchinson I., Jr., 1215 Barnett Bldg., Jacksonville, Fla. 1940.
Connick, Florence R. (Mrs. A. E.), 18 Tanglewood Road, Berkeley, Calif. 1936.
Conover, H. B., 6 Scott St., Chicago, Ill. 1924 (1924). [L.]
Conway, Raymond F., Box 1026, Grass Valley, Calif. 1939.
Cook, Miss Inez, P. O. Box 203, Glendora, Calif. 1924.
Cook, Kenneth, 308 N. 3rd St., Douglas, Wyo. 1940.
Cooke, Miss May T., Apt. 401, 1400 Fairmont St., N. W., Washington, D. C. 1918.
Cottam, Clarence, Fish & Wildlife Service, Washington, D. C. 1926.
Couffer, Jack Craig, 1625 Country Club Drive, Glendale, Calif. 1942.
Coursen, G. Blair, 761 E. 69th Place, Chicago, Ill. 1929.
Courtright, Mrs. Mary L., 3 Elm Ave., Larkspur, Calif. 1936.
Covel, Paul F., 3133 Jordan Road, Oakland, Calif. 1935.
Cowan, Dr. Ian McTaggart, Dept. of Zoology, Univ. B. C., Vancouver, B. C., Canada. 1937.
Cowles, Dr. Raymond B., Univ. Calif. at Los Angeles, Los Angeles, Calif. 1928.
Cramer, Miss Frances Leon, 921 W. 36th Place, Los Angeles, Calif. 1940.
Crawford, Franklin Goodrich, 2610 Glen Ave., Altadena, Calif. 1939.
Crockett, Harry L., 76 Columbus Ave., Phoenix, Ariz. 1924.
Crook, Compton, State Teachers College, Towson, Md. 1937.
Crouch, James E., San Diego State College, San Diego, Calif. 1934.
Crowley, Miss Josephine Frances, 259 Buena Vista Ave., San Francisco, Calif. 1941.
Culbertson, A. E., Fresno State College, Fresno, Calif. 1937.
Culbreath, Jack Chalmers, 2412 Channing Way, Berkeley, Calif. 1942.
Culver, George B., 541 Los Arboles Ave., Stanford University, Calif. 1921.
Currier, Ed S., 8541 N. Chicago Ave., St. Johns Sta., Portland, Ore. 1904.
Curtis, Miss Elizabeth L., 5648 Beach Drive, Seattle, Wash. 1933.
Cushing, John Eldridge, Jr., Dept. of Genetics, Calif. Inst. Technology, Pasadena, Calif. 1934.
Cushman, Lester H., So. Calif. Jr. College, Arlington, Calif. 1934.

D

Dahl, Richard G., 5061 Congress Ave., Oakland, Calif. 1938.
Dale, Frederick H., State Department of Conservation, Lansing, Mich. 1937.
Danby, Durward E., Rt. 3, Box 502, Santa Cruz, Calif. 1927.
Davidson, Mrs. Phyllis, 515 Lytton Ave., Palo Alto, Calif. 1939.
Davis, David Edward, 721 Elmwood Ave., Wilmette, Ill. 1936.
Davis, Howard P., 2608½ W. Ramona Blvd., Alhambra, Calif. 1932-34, 1941.
Davis, James Randall, 1915 Marin Ave., Berkeley, Calif. 1931.

Davis, John, Ivanhoe Hotel, 2400 Durant Ave., Berkeley, Calif. 1938.
Davis, John M., 227 Clark St., Eureka, Calif. 1908.
Davis, L. Irby, Box 988, Harlingen, Texas. 1940.
Davis, Dr. Wm. B., Box 254, Faculty Exchange, College Station, Texas. 1930.
Day, Ezra R., 3789 S. 52nd West St., Salt Lake City, Utah. 1932.
Deane, Mrs. Ruthven, 830 Hibbard Road, Winnetka, Ill. 1939 (1939). [L.]
Dearborn, Dr. Ned, 213 Ferguson Ave., Hilton Village, Va. 1909.
DeGroot, Dudley S., 38 Oakdale Drive, Rochester, N. Y. 1916.
Delacour, Jean, New York Zoological Society, New York, N. Y. 1927.
DeLury, Ralph E., Dominion Observatory, Ottawa, Ontario, Canada. 1926.
DeMay, Miss Ida S., 8475 Elizabeth Ave., South Gate, Calif. 1939.
DeMay, Mrs. Maybelle E., 8422 Elizabeth Ave., South Gate, Calif. 1938.
Denny, Judge Thomas C., Sonoma, Calif. 1924.
DeTracy, Herbert Pierre, Bradley, Calif. 1936.
Deuprey, Mrs. Clifton Swisher, 1419 Solano Ave., Albany, Calif. 1935.
Dexter, B. D., 2519 Ashby Ave., Berkeley, Calif. 1928.
Dickey, Florence V. V. (Mrs. Donald R.), Twin Oaks Ranch, Ojai, Calif. 1923.
Dille, Fred M., 822 Grand Ave., Nogales, Ariz. 1903.
Dixon, James B., Rt. 1, Box 688, Escondido, Calif. 1924.
Dixon, Joseph S., 1735 Allston Way, Berkeley, Calif. 1904.
Dixon, Ralph E., Rt. 2, Box 360, Escondido, Calif. 1935.
Dodge, Ernest Stanley, Peabody Museum, Salem, Mass. 1936.
Dodge, Thomas Henry, Gallup, New Mexico. 1936.
Dodson, Mrs. Leigh M., 1046 S. Holt Ave., Los Angeles, Calif. 1929.
Dow, Jay Sylvester, Litchfield, Calif. 1939.
Driver, E. Raymond, Box 110, Old Stage Road, Central Point, Ore. 1940.
DuBois, Alexander Dawes, Rt. 2, Christmas Lake Road, Excelsior, Minn. 1911.
Du Bois, H. M., Rt. 1, Box 209A, Clackamas, Ore. 1931.
Duff, C. V., 1922 Tamarind Ave., Hollywood, Calif. 1939.
Duffield, Mrs. J. W., St. Mary's School, Peekskill, N. Y. 1937.
DuMont, Philip A., 405 N. Cleveland St., Arlington, Va. 1932.
Durham, Floyd E., 2593 Life Sciences Bldg., Univ. of Calif., Berkeley, Calif. 1940.
Dyer, George B., Diabase Farm, New Hope, Bucks Co., Pa. 1940.

E

Ebert, Ruth (Mrs. Ernest C.), 413 Shore Drive, Manette, Wash. 1941.
Edge, Mrs. Charles Noel, 1200 Fifth Ave., New York, N. Y. 1932.
Edge, Chester W., Rt. 2, Box 44, Healdsburg, Calif. 1930.
Edge, Elton R., San Bernardino Valley Junior College, San Bernardino, Calif. 1932.
Edson, J. M., 2210 Victor St., Bellingham, Wash. 1911.
Edwards, Myrtle S. (Mrs. Harlan), 3509 W. Laurelhurst Drive, Seattle, Wash. 1924.
Eggleston, J. W., Cuttingsville, Vt. 1913 (1919) [L.].
Einarsen, Arthur Skogman, Poultry Bldg., Corvallis, Ore. 1936.
Elder, A. W., Fish & Wildlife Service, 1503 Federal Bldg., Los Angeles, Calif. 1941.
Ellis, Ralph, 2420 Ridge Road, Berkeley, Calif. 1923 (1926). [L.]
Elmore, Louis A., 2022 Yolo Ave., Berkeley, Calif. 1935.
Emerson, Guy, 9 Washington Mews, New York, N. Y. 1936.
Emilio, S. Gilbert, 7 Winter St., Salem, Mass. 1926.
Emlen, John T., Jr., College of Agriculture, Davis, Calif. 1930.
England, Ewin G., Jr., Box 22, Durham, Calif. 1940.
Erickson. Dr. Mary M., Santa Barbara State College, Santa Barbara, Calif. 1930.
Errington, Paul Lester, Insectary, Iowa State College, Ames, Iowa. 1932.
Evins, Samuel Nesbitt, 188 14th St., N. E., Atlanta, Ga. 1929.
Ewan, Joseph Andorfer, Dept. of Biology, Univ. of Colo., Boulder, Colo. 1937.

F

Failing, Robert, 518 66th St., Oakland, Calif. 1933.
Failla, Miss Janet, Museum of Vertebrate Zoology, Berkeley, Calif. 1940.
Fairbanks, Paul Henry, 2304A Spaulding St., Long Beach, Calif. 1942.
Fairchild, Jim, 3960 11th St., Riverside, Calif. 1941.
Fanning, Frank D., P. O. Box 32, Safford, Ariz. 1939.
Fargo, William G., 506 Union St., Jackson, Mich. 1928.
Farley, Frank L., Camrose, Alberta, Canada. 1923.

Farson, Clyde, 1422 Norton Ave., Glendale, Calif. 1942.
Feltes, Charles H., 437 Myrtle Ave., Modesto, Calif. 1935.
Ferris, Reed W., Beaver, Ore. 1931.
Field, Clyde L., 2534 K Ave., National City, Calif. 1919.
Figgins, J. D., Dept. of Zoology, University of Kentucky, Lexington, Ky. 1925.
Finley, William L., R.F.D. 10, Box 426A, Portland, Ore. 1900.
Fisher, Dr. A. K., Room 77, U. S. National Museum, Washington, D. C. 1904 (1924) [Honorary].
Fisher, Miss Edna M., 2410 Fulton St., Berkeley, Calif. 1923.
Fisher, Harvey Irvin, Dept. of Zoology, Univ. of Calif., Berkeley, Calif. 1939.
Fisher, Prof. Walter K., Hopkins Marine Sta., Pacific Grove, Calif. 1900.
Fitch, Dr. Henry Sheldon, Fish & Wildlife Service, San Joaquin Experimental Range, O'Neals, Calif. 1933.
Fleming, Charles B., Jr., care National Monument, Holbrook, Ariz. 1940.
Fletcher, Kathryn K. (Mrs. Howard), 24 Roble Court, Berkeley, Calif. 1942.
Floyd, Joseph L., Court House, Canton, Ohio. 1940.
Follett, W. I., 3501 Broadway, Oakland, Calif. 1926.
Fosberg, Maynard, Rt. 3, Box 3313, Turlock, Calif. 1941.
Fossler, Miss Mary L., 550 N. Los Robles Ave., Pasadena, Calif. 1935.
Fowler, Frederick H., 1727 Massachusetts Ave., Washington, D. C. 1901.
Fox, Miss Dorothea B., 1035 W. 35th St., Los Angeles, Calif. 1941.
Frames, Mrs. Donald C., 1730 Middlefield Road, Palo Alto, Calif. 1934.
French, Franklin, A32 Straus Hall, Harvard University, Cambridge, Mass. 1941.
Friedmann, Dr. Herbert, Div. Birds, U. S. National Museum, Washington, D. C. 1927.
Fritz, Esther C. (Mrs. Emanuel), 102 The Uplands, Berkeley, Calif. 1935.
Frost, Wilfrid T., Crater Lake National Park, Fort Klamath, Ore. 1931.
Furniss, Owen Cecil, 2203 First Ave. West, Prince Albert, Sask., Canada. 1936.

G

Gabrielson, Dr. Ira N., Fish & Wildlife Service, Washington, D. C. 1919.
Gadd, Samuel W., 1019 N. Nevada St., Colorado Springs, Colo. 1942.
Ganier, Albert F., 2112 Woodlawn Drive, Nashville, Tenn. 1939.
Garber, Miss Lida J., 15 Tanglewood Road, Berkeley, Calif. 1923.
Gardner, Dr. Leon L., 1815 Kilbourne Place, N. W., Washington, D. C. 1911-1916, 1926.
Garrison, David L., 121 Highland St., West Newton, Mass. 1940.
Garrity, Devin A., 23 E. 26th St., New York, N. Y. 1940.
Gausbeck, A. T., 50 Broadway, New York, N. Y. 1924.
Gay, Harold S., Rt. 1, Box 339, Redlands, Calif. 1901.
Geist, Otto William, University of Alaska, P. O. College, Alaska. 1942.
Gensch, Robert H., U. S. Forest Service, Rhinelander, Wis. 1940.
George, William G., 257 N. Branciforte Ave., Santa Cruz, Calif. 1941.
Gibb, Andrew Shirra, 2664 Shasta Road, Berkeley, Calif. 1938.
Gibson, John Herbert, 2814 College Ave., Berkeley, Calif. 1936.
Gifford, Dr. Harold, 1620 Medical Arts Bldg., Omaha, Nebr. 1916.
Gilliam, Miss Helen L., 112 Agriculture Hall, Univ. of Calif., Berkeley, Calif. 1937.
Gilman, M. French, Banning, Calif. 1901.
Gilmore, Mrs. Leno M., Tionesta, Modoc Co., Calif. 1937.
Gladding, Miss Hope Mehldeau, 970 Miller Ave., Berkeley, Calif. 1934.
Glassell, Steve A., 9533 Santa Monica Blvd., Beverly Hills, Calif. 1929.
Gloyd, Dr. Howard K., Chicago Academy Sciences, 2001 N. Clark St., Chicago, Ill. 1937.
Goethe, C. M., Capital Nat'l Bank Bldg., Sacramento, Calif. 1938.
Goelitz, Walter A., 345 Meadow Brook Ave., Ridgewood, N. J. 1915 (1920). [L.]
Goldman, Edward A., Fish & Wildlife Service, Washington, D. C. 1901.
Goldman, Luther C., Fish & Wildlife Service, Bitter Lake Nat'l Wildlife Refuge, Roswell, New Mex. 1942.
Goldman, Luther J., 612 Beloit Ave., Berkeley, Calif. 1937.
Goolden, Mrs. Elizabeth Burwell, 5611 Carlton Way, Los Angeles, Calif. 1940.
Gordon, Kenneth L., Dept. Zool., State Agricultural College, Corvallis, Ore. 1927.
Gorsuch, D. M., U. S. Forest Service, Williams, Ariz. 1939.
Graham, Hatch, 503 Hall of Justice, Los Angeles, Calif. 1937.
Graham, J. Duncan, Box 27, Benicia, Calif. 1937.
Grant, James, Jr., Trinity Valley, Lumby P. O., British Columbia, Canada. 1941.
Grater, Russell K., Zion National Park, Springdale, Utah. 1938.

Gray, John Albert, Jr., 4209 Idaho St., San Diego, Calif. 1940.
Greenhalgh, Clifton M., 1230 E. 1st South, Salt Lake City, Utah. 1939.
Gregory, Stephen S., Jr., Box N, Winnetka, Ill. 1924.
Grimes, Samuel A., Rt. 5, Box 284F, Jacksonville, Fla. 1924.
Grinnell, Hilda Wood (Mrs. Joseph), 2737 Forest Ave., Berkeley, Calif. 1912 (1921). [L.]
Griscom, Ludlow, Museum of Comparative Zoology, Cambridge, Mass. 1933.
Groody, Thomas Conrad, Museum of Vertebrate Zoology, Berkeley, Calif. 1940.
Gross, Prof. Alfred O., 11 Boody St., Brunswick, Maine. 1923.
Guest, Miss Marjorie Lee, 4403 Marlborough Drive, San Diego, Calif. 1942.
Guggolz, Jack, Rt. 3, Box 303, Lodi, Calif. 1940.
Guion, George Seth, 1716 American Bank Bldg., New Orleans, La. 1911.

H

Hachisuka, The Marquess, Mita Shiba, Tokyo, Japan. 1928.
Hackley, Mrs. Sadie Gilmore, 807 Waverly St., Palo Alto, Calif. 1934.
Hadsall, Dr. Leo F., Fresno State College, Fresno, Calif. 1937.
Haecker, Frederick W., 506 S. 52nd St., Omaha, Nebr. 1940.
Haefner, Miss Emma, 2425 Fulton St., Berkeley, Calif. 1931.
Hager, Miss Elizabeth, 1837 Euclid Ave., San Marino, Calif. 1931.
Hague, Miss Florence S., Dept. Biol., Sweet Briar College, Sweet Briar, Va. 1925.
Haines, A. Lee, Topanga, Calif. 1941.
Haley, Dr. George, P. O. Box 265, Berkeley, Calif. 1925.
Hall, Edward M., 802 E. 4th St., Whittier, Calif. 1937.
Hall, Dr. E. Raymond, Museum Vertebrate Zoology, Univ. of Calif., Berkeley, Calif. 1924.
Halladay, Daniel S., 628 E. Chestnut Ave., Santa Ana, Calif. 1910.
Haller, Karl William, No. 3 Martindill Terrace, Maple Ave., Woodsdale, Wheeling, W. Va. 1936.
Halloran, Arthur F., P. O. Box 791, Las Cruces, New Mex. 1933.
Hamlin, John W., 9 Bridge Road, Berkeley, Calif. 1936.
Hampe, Irving Edward, 119 Ashbourne Road, Halethorpe, Md. 1938.
Hand, Ralph L., 543 S. 5th St., West, Missoula, Mont. 1927.
Handlan, John Welty, 409 41st St., Charleston, W. Va. 1935.
Hann, H. H., Otter Rock, Ore. 1909.
Hanna, Wilson C., 141 E. F St., Colton, Calif. 1902 (1921). [L.]
Hannum, Robert G., 3634 Hughes Ave., Palms, Calif. 1934.
Hardy, Ross, Dixie College, St. George, Utah. 1938.
Hargrave, Lyndon L., Benson, Ariz. 1931.
Harper, Dr. Francis, 224 S. Chester Road, Swarthmore, Pa. 1920.
Harris, Dr. Arthur Trevenning, 275 Broadway, Laguna Beach, Calif. 1941.
Harris, Harry, 5234 Hermosa Ave., Eagle Rock, Los Angeles, Calif. 1914 (1919). [L.]
Harrison, Ed N., Box 324, Encinitas, Calif. 1931 (1941) [L.].
Harry, Beverly H., 6417 Dana St., Oakland, Calif. 1941.
Hartung, Miss Esther Margaret, 124 Mill St., Grass Valley, Calif. 1923.
Harwell, Charles Albert, 2630 Hilgard Ave., Berkeley, Calif. 1925.
Hatfield, Donald M., Chicago Academy of Sciences, 2001 N. Clark St., Chicago, Ill. 1934.
Hathaway, Harry S., Riverside and Thorne Aves., South Auburn, Cranston, R. I. 1912.
Hatton, Mrs. Louise M., Box 200, Calera Canyon Road, Salinas, Calif. 1931.
Havemeyer, Henry O., Mahwah, N. J. 1917.
Hawbecker, Albert C., 824 Lincoln St., Watsonville, Calif. 1936.
Hawk, Miss Lucy Bell, 219 N. Calaveras St., Fresno, Calif. 1940.
Hawkins, Leslie Gilman, 6108 Overhill Drive, Los Angeles, Calif. 1930-35, 1941.
Haynke, Carl Frederick, 813 San Carlos Ave., Albany, Calif. 1939.
Hayward, C. Lynn, Dept. Zoology, Brigham Young University, Provo, Utah. 1938.
Hazeltine, Karl Snyder, State College, San Jose, Calif. 1936.
Head, Glen B., 337 Haskins St., Klamath Falls, Ore. 1936.
Heaton, Harry Lee, 3753 29th St., San Diego, Calif. 1939.
Hedges, R. Frank, P. O. Box 185, Mesilla Park, New Mex. 1939.
Heineman, O. J., 14 Bay View, Mill Valley, Calif. 1908.
Helme, Arthur H., 223 Bayview Terrace, Port Jefferson, N. Y. 1911.
Helmuth, William Tod, 3rd, Jericho Lane, Easthampton, Long Island, N. Y. 1933.
Hemphill, Donald Vincent, 1415 Makiki St., Honolulu, T. H. 1937.
Henderson, Walter C., 8 Magnolia Parkway, Chevy Chase, Md. 1918.
Henne, Christopher, 3rd, 312 Grand Ave., South Pasadena, Calif. 1929.
Henry, Wilbur V., Rt. 1, Box 381, Los Altos, Calif. 1934.

Hersey, F. Seymour, Easton, Mass. 1915 (1920). [L.]
Hersey, Merrick Fred, care Calif.-Hawaiian Sugar Co., 82 Wall St., New York, N. Y. 1937.
Hicks, Dr. Lawrence E., Ohio Wildlife Research Sta., Ohio State University, Columbus, Ohio. 1936 (1936). [L.]
Hill, Harold Merrill, 329 Summit Ave., Redlands, Calif. 1935.
Hilton, Dr. W. A., Pomona College, Claremont, Calif. 1921.
Hinshaw, Thomas Doane, Museum of Zoology, Univ. of Michigan, Ann Arbor, Mich. 1931.
Hinton, Sam D., Box 411, Palm Springs, Calif. 1939.
Hjersman, Henry Arthur, 178 Vernon Terrace, Oakland, Calif. 1940.
Hoffmeister, Donald F., Museum of Vertebrate Zoology, Berkeley, Calif. 1940.
Holdenreid, Robert, Hooper Foundation, U. C. Medical Center, San Francisco, Calif. 1940.
Holland, Harold M., Box 515, Galesburg, Ill. 1901 (1920). [L.]
Holman, F. C., Box 115, Carmel, Calif. 1914 (1928). [L.]
Hood, Miss Mary V., 138 S. Wilton Drive, Los Angeles, Calif. 1940.
Hooper, Emmet T., Museum of Zoology, Univ. of Mich., Ann Arbor, Mich. 1934.
Hoover, Mrs. Glenn E., 4488 Reinhardt Drive, Oakland, Calif. 1936.
Hoover, Prof. Theodore J., Davenport, Santa Cruz Co., Calif. 1898 (1916). [L.]
Horsfall, R. Bruce, 3835 S St., N.W., Washington, D. C. 1914.
House, Verl Lee, 409 Central Ave., Madera, Calif. 1939.
Howard, Dr. Hildegarde, Los Angeles Museum, Exposition Park, Los Angeles, Calif. 1924.
Howard, William Johnson, 5518 Fairglen Lane, Chevy Chase, Md. 1938.
Howell, A. Brazier, Dept. of Anatomy, Johns Hopkins Medical School, Baltimore, Md. 1908 (1915). [L.]
Howsley, Lucien B., 1509 9th Ave., Seattle, Wash. 1931.
Howsley, Lucien R., 1871 W. 94th St., Los Angeles, Calif. 1927.
Hubbard, Douglass, 18 S. 13th St., San Jose, Calif. 1937.
Huber, Wharton, Rt. 2, Pottstown, Pa. 1915.
Hudson, Miss Benita, 250 N. Canon Drive, Beverly Hills, Calif. 1941.
Huey, Laurence M., Natural History Museum, Balboa Park, San Diego, Calif. 1909 (1921). [L.]
Huffman, Miss Rhoda, Box 75, Fair Oaks, Calif. 1941.
Hughes, George T., Rt. 3, Plainfield, N. J. 1927.
Hull, Archie V., Monida, Mont. 1941.
Hungate, Prof. J. W., Eastern Washington College of Education, Cheney, Wash. 1924.
Hunn, John T. S., 1218 Prospect Ave., Plainfield, N. J. 1939.
Hunter, Robert, Jr., The Meadow Ranch, Red Bluff, Calif. 1941.
Hurd, Paul David, Jr., 2461 Warring St., Berkeley, Calif. 1940.
Hurley, John B., 401 S. 17th St., Yakima, Wash. 1921.
Hussey, Mrs. Arthur E., 6017 Atlas Place, Seattle, Wash. 1940.
Hutchinson, Mrs. Magdeleine C., Chester Springs, Chester Co., Pa. 1940.
Hyde, A. Sidney, 1302 4th St., La Grande, Ore. 1939.

I

Ingersoll, Albert M., 908 F St., San Diego, Calif. 1895 (1932) [Honorary].
Ingles, Lloyd Glenn, Chico State College, Chico, Calif. 1936.
Irvine, Milton Boyd, 626 N. Electric Ave., Alhambra, Calif. 1937.

J

Jackson, Dr. Hartley H. T., Fish & Wildlife Service, Washington, D. C. 1921.
Jacot, Edouard C., 337 N. Norris Ave., Tucson, Ariz. 1923.
Jaeger, Edmund C., 4462 W. 6th St., Riverside, Calif. 1922.
Jefcoat, Arthur W., care Pacific Gas and Electric Co., Paynes Creek, Calif. 1937.
Jenkins, Hubert O., 2116 3rd Ave., Sacramento, Calif. 1933.
Jenks, Randolph, Rancho Esperero, Univ. Sta., Tucson, Ariz. 1931.
Jewett, Stanley G., 1404 Bidwell St., S. E., Portland, Ore. 1909.
Johnson, Miss Alice Victoria S., 2834 Garber St., Berkeley, Calif. 1941.
Johnson, Archibald, Rt. 2, Jamestown, N. D. 1934.
Johnson, Dr. David H., 7305 Princeton Ave., College Park, Md. 1937.
Johnson, Elizabeth O. (Mrs. D. H.), 7305 Princeton Ave., College Park, Md. 1937.
Johnson, Miss Linnea M., P. O. Box 156, Turlock, Calif. 1936.
Johnson, Dr. Myrtle E., 4647 55th St., San Diego, Calif. 1908.
Jones, John C., Wildlife Research Center, Delmar, N. Y. 1940.
Jones, Dr. Lynds, 352 W. College St., Oberlin, Ohio. 1911.
Jones, S. Paul, 509 West Ave., North, Waukesha, Wis. 1929.
Jones, Victor E., Univ. of Idaho, Southern Branch, Pocatello, Idaho. 1938.

Jordan, A. H. B., Everett, Wash. 1911.
Jory, Mrs. Stafford L., 1370 Euclid Ave., Berkeley, Calif. 1936.

K

Kalmbach, Edwin R., 2654 Forest Ave., Denver, Colo. 1923.
Keene, Herman Belden, 14 McKevett Hts., Santa Paula, Calif. 1937.
Kellogg, Miss Louise, The Regillus, 19th and Jackson Sts., Oakland, Calif. 1911 (1927). [L.]
Kellogg, Miss Mildred, 2232 Piedmont Ave., Berkeley, Calif. 1921.
Kelly, Junea W. (Mrs. G. Earle), 1311 Grand St., Alameda, Calif. 1918.
Kelso, Leon, 1370 Taylor St., N. W., Washington, D. C. 1929.
Kendeigh, Dr. S. Charles, Vivarium Bldg., Univ. of Illinois, Wright and Healy Sts., Champaign, Ill. 1932.
Kennedy, Miss Jean, 816 Brown Ave., Fresno, Calif. 1937.
Kent, Wyatt A., 815 S. Irolo St., Los Angeles, Calif. 1940.
Kenyon, Karl Walton, 131 N. Quarry St., Ithaca, N. Y. 1934.
Kerr, Alexander H., 4647 Arcola St., North Hollywood, Calif. 1937.
Keyes, Prof. Charles R., 323 Tenth Ave., So., Mt. Vernon, Iowa. 1900.
Kibbe, Bessie W. (Mrs. A. S.), Div. Fish and Game, Ferry Bldg., San Francisco, Calif. 1917.
Kiessling, Victor Ralph, 720 E. Moreland St., Phoenix, Ariz. 1936.
Killam, Alfred L., 30 Oval Road, Oakland, Calif. 1937.
King, Benjamin H., 1215 Lakeshore Drive, Coeur d'Alene, Idaho. 1921.
King, Robbins S., Box 243, Cupertino, Calif. 1940.
Kinsey, Eric Campbell, Box 76, Manor, Calif. 1933.
Kirby, Prof. Harold, Jr., Dept. Zoology, Univ. Calif., Berkeley, Calif. 1930.
Kitchin, E. A., 4014 N. 35th St., Tacoma, Wash. 1935.
Kjerulf, Daniel O., 651 Harvard Ave., Fresno, Calif. 1941.
Kloss, Phillips, Taos, New Mex. 1929.
Knapp, Elmer, Rt. 2, Troy, Pa. 1924.
Kofoid, Prof. Chas. A., Dept. Zool., Univ. Calif., Berkeley, Calif. 1909.
Koford, Carl B., 2593 Life Sciences Bldg., Univ. of Calif., Berkeley, Calif. 1939.
Kraus, Douglas Lawrence, Rhode Island State College, Kingston, R. I. 1935.
Kuhn, Uhl R., 430 Wolf Ave., Chambersburg, Pa. 1935.
Kuser, John Dryden, 16 South St., Somerville, N. J. 1912.

L

Labarthe, Jules, 21 Plaza Drive, Berkeley, Calif. 1914.
Laing, Hamilton M., Comox, B. C., Canada. 1926.
Lamb, Chester C., Cinco de Mayo No. 50, Irapuato, Guanajuato, Mexico. 1899.
Landstroth, James H., P. O. Box 800, Silver City, New Mex. 1922.
La Rivers, Ira, P. O. Box 1493, Reno, Nev. 1940.
Laskey, Amelia R. (Mrs. Fred C.), Graybar Lane, Nashville, Tenn. 1933.
Lastreto, C. B., 22 Battery St., San Francisco, Calif. 1913.
Leavens, Mrs. Robert French, 1900 Yosemite Road, Berkeley, Calif. 1928.
Lee, LeVon, T-301, Billings General Hospital, Fort Harrison, Ind. 1941.
Leitch, Mrs. Mary S., Homestead Ave., Bel Air, Md. 1929.
Leopold, Prof. Aldo, Div. of Wildlife Management, 424 Univ. Farm Place, Madison, Wis. 1916.
Leopold, Aldo Starker, Box 247, West Plains, Mo. 1938.
Lewis, Mrs. Gilbert Newton (Mary H.), 948 Santa Barbara Road, Berkeley, Calif. 1939.
Ligon, J. Stokley, Box 950, Carlsbad, New Mex. 1914.
Lincoln, Frederick C., Fish & Wildlife Service, Washington, D. C. 1922.
Linsdale, Dr. Jean M., Jamesburg Route, Monterey, Calif. 1926.
Little, Luther, 2305 Brentford Road, San Marino, Calif. 1913 (1920). [L.]
Little, Mrs. Patricia Anderson, Box 197, Walnut Creek, Calif. 1934.
Littlejohn, Chase, 323 E. Brewster Ave., Redwood City, Calif. 1894.
Livermore, John Walton, 130 East End Ave., New York, N. Y. 1940.
Lloyd, Hoyes, 582 Mariposa Ave., Rockcliffe Park, Ottawa, Canada. 1923.
Locke, Samuel B., 1140 Park Square Bldg., Boston, Mass. 1931.
Lockwood, Frank Fairfax, Mortensen Studio, Laguna Beach, Calif. 1939.
Lofberg, Mrs. Lila McKinley, Roads End, Calif. 1925.
Long, W. S., Nephi, Utah. 1936.
Longhurst, William, Zoology Dept., Cornell Univ., Ithaca, N. Y. 1939.
Loof, Henry B., Oak Harbor, Wash. 1937.
Lorenz, Frederick W., College of Agriculture, Davis, Calif. 1941.
Loring, J. Alden, U. S. Army, Owego, Tioga Co., N. Y. 1914.
Lory, Miss Daisy M., 497 Forest St., Oakland, Calif. 1936.

Lowery, George Hines, Jr., Box 316, Louisiana State University, University, La. 1938.
Lyons, Torrey, Pan American Airways, Treasure Island, San Francisco, Calif. 1939.

Mc

McAtee, W. L., Fish & Wildlife Service, Washington, D. C. 1907.
McCabe, Thomas T., 2731 Prince St., Berkeley, Calif. 1926.
McClain, Andrew, Rt. 1, Box 72, Clovis, Calif. 1937.
McClintock, Edwin H., 1204 Balboa Ave., Burlingame, Calif. 1936.
McCoy, Frank J., Santa Maria Inn, Santa Maria, Calif. 1932.
McCoy, Herbert N., 1226 Westchester Place, Los Angeles, Calif. 1928. [L.]
McCracken, Dr. Isabel, Box 1545, Stanford University, Calif. 1933.
McCreary, Otto, Agricultural Hall, Univ. Wyo., Laramie, Wyo. 1928.
McDonald, Floyd A., P. O. Box 283, Vista, Calif. 1936.
McDonald, Mrs. James R., P. O. Box 494, Laurel Ave., Ross, Marin Co., Calif. 1927 (1927). [L.]
McGettigan, C. Carroll, 2644 Filbert St., San Francisco, Calif. 1940.
McIlhenny, Edward Avery, Avery Island, La. 1934.
McKnight, Edwin Thor, 5038 Park Place, Friendship Sta., Washington, D. C. 1936.
McLain, Donald, 160 W. Laurel Ave., Altadena, Calif. 1930-33, 1939.
McLain, Robert B., Box 132, Hollywood, Calif. 1897.
McLean, Donald D., 101 E. St. James St., San Jose, Calif. 1916.
McLean, Miss Susanne W., 1102 Amherst, Claremont, Calif. 1941.
McManus, William Reid, Memramcook, New Brunswick, Canada. 1931.
Macnab, Prof. James A., 1037 S. Davis St., McMinnville, Ore. 1935.

M

Mahan, Mrs. Margaret P., 4127 W. 62nd St., Los Angeles, Calif. 1942.
Mailliard, Ernest C., Federal Reserve Bank, San Francisco, Calif. 1909.
Mailliard, Joseph, 1815 Vallejo St., San Francisco, Calif. 1895 (1920). [L.] (1924) [Honorary].
Marsh, Vernon L., Botany Dept., Univ. of Wash., Seattle, Wash. 1933.
Marshall, Dr. Arthur P., 778 Higuera St., San Luis Obispo, Calif. 1932.
Marshall, Joe T., Jr., Museum of Vertebrate Zoology, Berkeley, Calif. 1936.
Marshall, William H., Box 1998, Boise, Idaho. 1937.
Martin, E. Whitney, 525 Lincoln Ave., Palo Alto, Calif. 1937.
Martin, Patrick W., Rt. 3, 1051 Burnside Road, Victoria, B. C., Canada. 1931.
Mason, Dr. Herbert L., 1190 Sterling Ave., Berkeley, Calif. 1927.
Mayr, Dr. Ernst, American Museum of Natural History, New York, N. Y. 1933.
Meade, Gordon M., Strong Memorial Hospital, Rochester, N. Y. 1941.
Meadows, Donald C., 640 Terraine Ave., Long Beach, Calif. 1919.
Memmler, Miss Viola, 1448 Josephine St., Berkeley, Calif. 1942.
Mershon, W. B., Saginaw, Mich. 1911 (1919). [L.]
Michael, Enid (Mrs. C. W.), 637 Winona Ave., Pasadena, Calif. 1942.
Michener, Harold, 418 N. Hudson Ave., Pasadena, Calif. 1924.
Michener, Josephine R. (Mrs. H.), 418 N. Hudson Ave., Pasadena, Calif. 1934.
Miller, Dr. Alden Holmes, Museum Vertebrate Zoology, Univ. of Calif., Berkeley, Calif. 1923.
Miller, Edwin Vance, State Game Farm, Chino, Calif. 1939.
Miller, Prof. Loye Holmes, Univ. Calif. at Los Angeles, Los Angeles, Calif. 1905 (1936) [Honorary].
Miller, Malcolm Ray, Univ. Calif. at Los Angeles, Los Angeles, Calif. 1940.
Miller, Miss Mary Mann, 5928 Hayes Ave., Highland Park, Los Angeles, Calif. 1920.
Miller, Ralph Haley, 2412 Channing Way, Berkeley, Calif. 1942.
Miller, Dr. Robert C., Calif. Academy of Sciences, Golden Gate Park, San Francisco, Calif. 1921.
Miller, Roland Kent, 2424 Spaulding Ave., Berkeley, Calif. 1942.
Miller, William Thomas, 1809 Bushnell Ave., South Pasadena, Calif. 1937.
Mitchell, Dr. Walton I., 398 Vassar Ave., Berkeley, Calif. 1909.
Mocine, Ralph F., 2341 Cove Ave., Los Angeles, Calif. 1941.
Moeller, B. A., 2525 E. 37th St., Los Angeles, Calif. 1935.
Moeran, Edward H., 541 Bronx River Road, Yonkers, N. Y. 1940.
Moffitt, James, 1879 Broadway, San Francisco, Calif. 1917.
Monk, Harry C., 406 Avoca St., Nashville, Tenn. 1925.
Monson, Gale, Gen. Del., Socorro, New Mex. 1936.
Moore, Robert T., R. D. 1, Box 28A, Pasadena, Calif. 1911.
Moos, Louis M., Soil Conservation Service, Billings, Mont. 1938.

Moran, R. B., Room 1034, Bartlett Bldg., Los Angeles, Calif. 1897.
Morley, Prof. S. Griswold, 2635 Etna St., Berkeley, Calif. 1916.
Morton, Erle D., Rt. 2, Box 625, Tucson, Ariz. 1942.
Moser, Dr. R. Allyn, Suite 612, 1504 Dodge St., Omaha, Nebr. 1940.
Mowbray, Vincent, 102 Jefferson St., Vallejo, Calif. 1937.
Mulford, Miss Alice Stewart, 1637 Spruce St., Berkeley, Calif. 1933.
Munro, J. A., Okanagan Landing, B. C., Canada. 1914.
Murdock, James, 311 Irving St., Glendale, Calif. 1938.
Murie, Adolph, Jackson, Wyo. 1935.
Murie, Olaus J., Jackson, Wyo. 1913.
Murray, J. Laurence, P. O. Box 311, Compton, Calif. 1939.
Myers, Mrs. Harriet W., 311 N. Ave. 66, Los Angeles, Calif. 1912.
Myers, Miss Mabel Adelaide, 617 W. Center St., Anaheim, Calif. 1922.

N

Nace, Charles A., P. O. Box 148, Capitola, Calif. 1920 (1920). [L.]
Nash, Herman W., 515 W. 13th St., Pueblo, Colo. 1922.
Naumburg, Mrs. Walter W., American Museum Natural History, New York, N. Y. 1922.
Neff, Johnson A., Wildlife Research Laboratory, 546 Customhouse, Denver, Colo. 1920.
Neff, Mitchell Tabb, Kentfield, Marin Co., Calif. 1939.
Neil, Richard W., 2135 Haste St., Berkeley, Calif. 1942.
Nelson, Arnold L., 3256 Van Hazen St., N. W., Washington, D. C. 1932.
Nelson, Mrs. Jean M., 1729 Spruce St., Berkeley, Calif. 1929.
Nelson, Roy A., 5450 14th Ave., Sacramento, Calif. 1925.
Nelson, Theodore, 2695 Heath Ave., New York, N. Y. 1940.
Newton, Earl Thomas, Personnel Office, C. A. S. C., Unit No. 1930, Presidio of Monterey, Calif. 1941.
Nice, Mrs. Margaret M., 5708 Kenwood Ave., Chicago, Ill. 1921.
Nichols, Charles K., 212 Hamilton Road, Ridgewood, N. J. 1936.
Nichols, David Gelston, Apt. 6B, 9 E. 97th St., New York City, N. Y. 1939.
Nichols, John T., American Museum Nat. Hist., New York, N. Y. 1909.
Nichols, Mrs. Mary Jane, Rt. 5, Box 391B, Tucson, Ariz. 1939.
Nichols, Walter F., 120 S. San Rafael Ave., Pasadena, Calif. 1938.
Nicholson, Donald J., 1218 Greenwood Ave., Orlando, Fla. 1911.
Nickelsen, Dr. H. C., 920 S. Broadway, Tacoma, Wash. 1935.
Nielsen, Mrs. Beatrice Wise, 141 Bellevieu Drive, San Leandro, Calif. 1931-32, 1942.
Nixon, Joseph C., Box 584, Arlington, Calif. 1941.
Noack, Harry R., 309 Perry St., Oakland, Calif. 1901.
Nokes, Dr. I. D., 1120 Rives-Strong Bldg., Los Angeles, Calif. 1914.
North, Chandler P., 1687 Le Roy Ave., Berkeley, Calif. 1937.
Norton, Arthur H., 22 Elm St., Portland, Maine. 1918.

O

Oberholser, Dr. Harry C., 2805 18th St., N. W., Washington, D. C. 1904.
Oberlander, George T., 401 41st Ave., San Francisco, Calif. 1938.
Olson, Andrew C., Jr., Dept. of Zoology, Univ. of Idaho, Moscow, Idaho. 1940.
O'Melveny, Stuart, Huntington Hotel, Pasadena, Calif. 1931.
Orr, Dr. Robert T., 1842 Santiago St., San Francisco, Calif. 1931.
Osgood, Dr. Wilfred H., Field Museum Nat. Hist., Chicago, Ill. 1893 (1927). [L.]
Owen, Virgil W., Julian, Calif. 1896.
Owre, Oscar, Jr., 2625 Newton Ave., S., Minneapolis, Minn. 1937.

P

Painton, Dr. Harry R., 488 Lilac Drive, Montecito, Santa Barbara Co., Calif. 1893-97, 1936.
Painton, Mrs. Harry R., 488 Lilac Drive, Montecito, Santa Barbara Co., Calif. 1941.
Palmer, Miss Elizabeth Day, 1741 S. Harvard Blvd., Los Angeles, Calif. 1909.
Palmer, Fletcher G., 419½ N. First Ave., Upland, Calif. 1942.
Palmer, Dr. R. H., Neptuno 1060, Havana, Cuba. 1915.
Palmer, Dr. Theodore S., 1939 Biltmore St., N. W., Washington, D. C. 1903 (1920). [L.] (1929) [Honorary].
Paquette, Elmer, 121 S. Olive, Santa Paula, Calif. 1938.
Parker, Clarence J., 821 N. Garfield Ave., Alhambra, Calif. 1938.
Parker, Edgar J., U. S. Forest Service, Heppner, Ore. 1932.
Partin, J. L., 2151 Balsam Ave., Los Angeles, Calif. 1930.
Patrick, Dr. Leon, Mt. Ecclesia Sanatarium, Oceanside, Calif. 1931.

Patterson, Mrs. Theresa Homet, 544 S. El Molino Ave., Pasadena, Calif. 1926 (1926). [L.]
Paul, Lucius H., 766 Ave. D., Rochester, N. Y. 1911.
Payne, Ernest A., 836 W. I St., Ontario, Calif. 1934.
Pearse, Theed, Courtenay, B. C., Canada. 1927.
Pease, Charles A., 680 Spruce St., Berkeley, Calif. 1930.
Peattie, Donald Culross, 224 Buena Vista Road, Santa Barbara, Calif. 1939.
Peck, Prof. Morton E., 1552 Court St., Salem, Ore. 1909.
Peet, Dr. Max Minor, 2030 Hill St., Ann Arbor, Mich. 1937.
Pemberton, J. R., 1244 Morada Place, Altadena, Calif. 1900 (1928). [L.]
Pequegnat, Willis E., Biology Dept., Pomona College, Claremont, Calif. 1937.
Perley, Mrs. Lyman O., 520 S. 31st St., No. 8, Omaha, Neb. 1927 (1927). [L.]
Peters, James L., Museum of Comparative Zoology, Cambridge, Mass. 1933.
Peterson, Hans C., Rt. 2, Box 562, Reedley, Calif. 1924.
Peterson, James G., Box 3, Diablo, Calif. 1934.
Peterson, Roger Tory, 1006 Fifth Ave., New York, N. Y. 1939.
Pettingill, Dr. Olin Sewall, Dept. of Biology, Carleton College, Northfield, Minn. 1934.
Peyton, Laurence, R. D. 2, Fillmore, Calif. 1909 (1922). [L.]
Peyton, Sidney B., R. D. 2, Fillmore, Calif. 1913 (1922). [L.]
Phelps, Frank M., 312 Fifth St., Elyria, Ohio. 1912.
Philipp, Frederick B., 99 John St., New York, N. Y. 1936.
Phillips, Allan R., 113 Olive Road, Tucson, Ariz. 1933.
Phillips, Lieut.-Comdr. Neil, U.S.S. Sumner, care Postmaster, New York, N. Y. 1940.
Philp, Gordon G., Tonto National Monument, Roosevelt, Ariz. 1936.
Pickwell, Dr. Gayle B., San Jose State College, San Jose, Calif. 1928.
Pitelka, Frank Alois, Dept. of Zoology, Univ. of Calif., Berkeley, Calif. 1940.
Platford, Sidney D., 4166 Fifth Ave., Los Angeles, Calif. 1935.
Pleas, Mrs. F. W., Woodside, Rt. 1, Box 255, Redwood City, Calif. 1938.
Poole, Cecil A., 830 Chapman St., San Jose, Calif. 1941.
Potter, Miss Jessica A., 1118 Santee St., Los Angeles, Calif. 1922.
Pough, Richard H., 1006 Fifth Ave., New York, N. Y. 1926.
Powell, Miss Helen, Women's Faculty Club, Univ. Calif., Berkeley, Calif. 1914 (1928). [L.]
Powell, Walter N., Pinnacles National Monument, Pinnacles, Calif. 1935.
Pratt, Miss Helen Steele, 2451 Ridge View Ave., Eagle Rock, Calif. 1920-38, 1940.
Preble, Edward A., 3027 Newark St., Washington, D. C. 1926.
Presnall, Clifford C., 5315 Earlston Drive, Washington, D. C. 1930.
Price, John B., 532 Alvarado Row, Stanford University, Calif. 1926.
Price, Miss Ruth M., 315 El Nido, Monrovia, Calif. 1942.
Prill, Dr. A. G., Scio, Ore. 1921.
Pringle, Miss Cornelia C., 1816 Vallejo St., San Francisco, Calif. 1915 (1921). [L.]
Pulich, Warren M., 906 S. Center St., Stockton, Calif. 1941.
Pursell, Wm. McLain, 511 Neilson St., Berkeley, Calif. 1926.
Pyle, George W., Box 647, Berwyn, Pa. 1940.

Q

Quaintance, Charles W., Eastern Oregon College of Education, La Grande, Ore. 1934.
Quigley, Raymond, Jr., 2530 S. Barrington Ave., West Los Angeles, Calif. 1937.

R

Racey, Kenneth, 3262 W. First Ave., Vancouver, B. C., Canada. 1934.
Randall, Mrs. W. S., Alamo National Bldg., San Antonio, Texas. 1929.
Randolph, Miss Flora A., 360 42nd St., Oakland, Calif. 1907.
Ransom, Webster H., 1823 Smith Tower, Seattle, Wash. 1921.
Rapp, William F., Jr., 130 Washington Ave., Chatham, N. J. 1941.
Rass, Walter A., 626 W. Caldwell St., Compton, Calif. 1942.
Rathbun, S. F., 906 Summit Ave., Seattle, Wash. 1904.
Ray, Milton S., 2901 Broadway, San Francisco, Calif. 1899.
Reis, C. Oscar, 646 Juanita Ave., Los Angeles, Calif. 1917.
Rett, Egmont Z., Museum of Natural History, Santa Barbara, Calif. 1937.
Reuss, Alfred H., Jr., 12659 Western, Blue Island, Ill. 1938.
Reynolds, Robert Vernon, 1842 San Antonio, Berkeley, Calif. 1941.
Reynolds, Dr. T. Eric, 431 30th St., Oakland, Calif. 1934.
Reynolds, Mrs. T. Eric, 140 Estates Drive, Piedmont, Calif. 1940.
Rhudy, Florence V., 3543 Castle Reagh, Riverside, Calif. 1941.

Rich, C. Selwyn, 114 Charpin Place, Alhambra, Calif. 1919-22, 1939.
Rich, Dr. Guy C., 1820 El Cerrito Place, Hollywood, Calif. 1911.
Rich, Prof. Willis H., 442 Jordan Hall, Stanford University, Calif. 1934.
Richards, Dr. W. T., 1213 E. 51st St., Savannah, Ga. 1908.
Richardson, Carl, care J. W. Richardson, Trail, Ore. 1925.
Richardson, Mrs. Ethel R., 900 Hilldale Ave., Berkeley, Calif. 1941.
Richardson, Frank, Dept. of Zoology, Univ. of Nevada, Reno, Nev. 1935.
Richardson, William, P. O. Box 190, Porterville, Calif. 1925.
Rideout, Esther Jeanette, 709 Oak St., Santa Ana, Calif. 1942.
Ridgway, John L., 548 Pomona Ave., Coronado, Calif. 1926.
Rinehart, Miss Amy, 540 E. 7th St., Oakland, Calif. 1927.
Riney, Thane, 2799 Sawtelle Blvd., Los Angeles, Calif. 1942.
Ritter, Prof. William E., Hotel Claremont, Berkeley, Calif. 1901.
Roberts, Mrs. Frances S., Box 324, Encinitas, Calif. 1942.
Roberts, Dr. Thomas S., Museum Nat. History, Univ. Minnesota, Minneapolis, Minn. 1909.
Robertson, Howard, 157 Wilton Drive, Los Angeles, Calif. 1896 (1926). [L.]
Robertson, John McB., Buena Park, Calif. 1913.
Robertson, Mrs. John McB., Buena Park, Calif. 1920.
Robinson, William Stewart, 514 Bancroft Hall, Columbia University, New York, N. Y. 1935.
Rodgers, Thomas Lathan, Museum Vertebrate Zoology, Berkeley, Calif. 1937.
Rogers, Mrs. Caroline Wells, 1029 Vallejo St., Santa Rosa, Calif. 1938.
Rogers, Irl, 402 Alturas Ave., Modesto, Calif. 1935.
Rooney, James, Rt. 7, Yakima, Wash. 1939.
Ross, Hollis T., 109 S. 3rd St., Lewisburg, Pa. 1936.
Ross, Roland C., 1820 Bushnell Ave., South Pasadena, Calif. 1920.
Roullard, Fred P., Court House, Fresno, Calif. 1936.
Rowan, Prof. William, Dept. Zool., Univ. Alberta, Edmonton, Canada. 1921.
Rowley, John Stuart, 424 N. Valencia St., Alhambra, Calif. 1928.
Rudd, Robert L., 345 West St., Salinas, Calif. 1939.
Russell, Ward C., Museum Vertebrate Zoology, Berkeley, Calif. 1930.
Rust, Henry J., Box 683, Coeur d'Alene, Idaho. 1911.
Rutherford, Robert L., 4415 Victoria Park Drive, Los Angeles, Calif. 1941.

S

Sagal, Miss Bernice Elizabeth, 18492 Crest Ave., Hayward, Calif. 1940.
Sampson, Walter B., 1005 N. San Joaquin St., Stockton, Calif. 1894.
Sampson, W. F., care Bay Transport Co., Pier No. 1, San Francisco, Calif. 1926 (1928). [L.]
Sanders, Robert B., Box 337, Atascadero, Calif. 1939.
Sanford, Dr. Leonard C., Port Sewall, Fla. 1915.
Sargent, Grace Tompkins (Mrs. M. C.), Scripps Institution Oceanography, La Jolla, Calif. 1938.
Saunders, Aretas A., 361 Crestwood Road, Fairfield, Conn. 1909.
Saunders, George B., 1842 N. W. Washington, Brownsville, Texas. 1936.
Saunders, W. E., London, Ont., Canada. 1910.
Savage, James, Buffalo Athletic Club, Buffalo, N. Y. 1937.
Saylor, Lawrence W., Fish & Wildlife Service, Washington, D. C. 1937.
Schenck, Sara M. (Mrs. W. Egbert), Twenty-nine Palms, Calif. 1924.
Schneider, Fred A., care Warren Dried Fruit Co., San Jose, Calif. 1901.
Schneider, J. J., 203 S. West St., Anaheim, Calif. 1899.
Schorger, A. W., 168 N. Prospect Ave., Madison, Wis. 1928.
Schulz, Walter G., 2324 27th St., Sacramento, Calif. 1936.
Scott, Harriet Emlen (Mrs. C. E.), 978 Cragmont Ave., Berkeley, Calif. 1942.
Sebastian, Mrs. Irene, 1719½ 4th Ave., Los Angeles, Calif. 1938.
Sedgewick, Gerald Eugene, 2328 Dwight Way, Berkeley, Calif. 1940.
Sefton, J. W., Jr., 638 F St., San Diego, Calif. 1923.
Seibert, Milton Lewis, 4649 Redding St., Oakland, Calif. 1937.
Shane, Mary Lea (Mrs. C. D.), 89 San Mateo Road, Berkeley, Calif. 1942.
Sharp, Clarence S., Mountain View Rancho, El Cajon, Calif. 1902.
Shaw, Dr. W. T., 1002 Cambridge Ave., Fresno, Calif. 1911.
Shearer, Dr. A. R., Mont Belvieu, Chambers Co., Texas. 1928.
Sheffler, W. J., 4731 Angeles Vista Blvd., Los Angeles, Calif. 1930 (1937). [L.]
Sheldon, Mrs. Dorothy Dean, Women's Faculty Club, Berkeley, Calif. 1936.

Shepherd, Mrs. Hattie E., 114 W. Palm Ave., Redlands, Calif. 1921.
Sherman, Miss Althea R., Rt. 2, National, via McGregor, Iowa. 1911 (1916). [L.]
Sherwood, John W., Rt. 2, Box 150, Salinas, Calif. 1923.
Sibley, Charles G., 2939 Dwight Way, Berkeley, Calif. 1938.
Silliman, Edmund N., 36 Oak St., Salinas, Calif. 1918.
Silliman, O. P., 225 W. Alisal St., Salinas, Calif. 1893 (1937). [L.]
Sims, Mrs. R. M., 36 Hillcrest Road, Berkeley, Calif. 1933.
Skillen, Donald R., Rt. 1, Box 65, Pasadena, Calif. 1927.
Skinner, M. P., 345 E. Ocean Blvd., Long Beach, Calif. 1915 (1920). [L.]
Slipp, John W., Botany Dept., Univ. of Wash., Seattle, Wash. 1942.
Sloanaker, Jos. L., 1117 Maxwell Ave., Spokane, Wash. 1910.
Smart, Keith L., Coachella, Calif. 1939.
Smith, Allyn G., 722 Santa Barbara Road, Berkeley, Calif. 1909.
Smith, Anna Margaret (Mrs. Otis H.), 89 Elm Ave., San Anselmo, Calif. 1934.
Smith, Austin P., Zarcero, Costa Rica. 1907.
Smith, Clarence F., Fish & Wildlife Service, Washington, D. C. 1928.
Smith, Mrs. Elizabeth Burnell, 1035 N. Stanley Ave., Cole Branch, Los Angeles, Calif. 1921.
Smith, Miss Emily, Rt. 1, Box 93, Los Gatos, Calif. 1924.
Smith, Horace G., 2918 Lafayette St., Denver, Colo. 1914.
Smith, Miss Josephine Conly, Senior High School, San Bernardino, Calif. 1941.
Smith, Miss Josephine E., 51 Canyon Road, Berkeley, Calif. 1928.
Smith, Lloyd Mason, 514 Sierra Court, Ontario, Calif. 1940.
Smith, Loris Philbrick, 2017 108th Ave., Oakland, Calif. 1930.
Smith, Miss Natasha D., Star Route, Sandoval, New Mexico. 1937.
Smith, Ronald Ward, Dept. of Biology, Queens University, Kingston, Ontario, Canada. 1939.
Smith, Thomas Allen, 843 Indian Rock Ave., Berkeley, Calif. 1942.
Smith, Miss Winifred M., 46 Nace Ave., Piedmont, Calif. 1939.
Snell, Charles H., Box 101, Red Deer, Alberta, Canada. 1926.
Snyder, Prof. J. O., 757 Tennyson Ave., Palo Alto, Calif. 1900.
Snyder, L. L., Royal Ontario Museum of Zoology, Toronto, Ont., Canada. 1924.
Soper, J. Dewey, 827 Riverwood Ave., Fort Garry, Winnipeg, Manitoba, Canada. 1937.
Spaulding, Prof. M. Herrick, State Agricultural College, Bozeman, Mont. 1918.
Sprague, Miss Elizabeth F., Fullerton Union High School, Fullerton, Calif. 1940.
Sprinkle, Charles R., Chinook, Montana. 1936.
Stacey, John W., 236 Flood Bldg., San Francisco, Calif. 1940.
Stager, Kenneth E., 4300 Budlong Ave., Los Angeles, Calif. 1935.
Stannard, Carlos, Rt. No. 1, Box 1178, Phoenix, Arizona. 1935.
Stebbins, Robert Cyril, 17415 Ventura Blvd., Encino, Calif. 1939.
Steele, Ed. S., Box 341, North San Diego, Calif. 1926.
Steggall, Clair, 2809 Marsh St., Los Angeles, Calif. 1940.
Stephens, Mrs. Albert Blasdel, 1695 Filbert St., San Francisco, Calif. 1934.
Stephens, John R., 166 N. McCadden Place, Los Angeles, Calif. 1937.
Stephens, Prof. T. C., Morningside College, Sioux City, Iowa. 1914.
Stevenson, Elmo, Rt. 1, Corvallis, Ore. 1938.
Stevenson, James O., 5414 South Interior Bldg., Washington, D. C. 1928.
Stewart, Paul A., Leetonia, Ohio. 1920.
Stewart, Robert E., Patuxent Research Refuge, Bowie, Maryland. 1941.
Stillwell, Jerry E., 7460 San Benito Way, Dallas, Texas. 1936.
Stoddard, H. L., Sherwood Plantation, Thomasville, Ga. 1914.
Stoddard, M. Palmer, 309 N. Crescent Drive, Beverly Hills, Calif. 1940.
Stokes, James D., Div. of Fish & Game, Ferry Bldg., San Francisco, Calif. 1939.
Stone, Harry Herbert, Jr., P. O. Box 101, Sturbridge, Mass. 1925.
Stone, Ned W., 2418 California St., Berkeley, Calif. 1939.
Stoner, Emerson A., Box 444, Benicia, Calif. 1918.
Stoodley, Dr. Gerald F., 752 Santa Barbara Road, Berkeley, Calif. 1934.
Storer, Robert Winthrop, 2420 Channing Way, Berkeley, Calif. 1941.
Storer, Prof. Tracy I., University Farm, Davis, Calif. 1910.
Stott, Ken W., Jr., 1724 Guizot St., San Diego, Calif. 1941.
Streator, Clark P., 229 Otis St., Santa Cruz, Calif. 1919.
Sturgeon, Jack, Star Rt. No. 1, Darrington, Wash. 1936.
Suffel, Shumway, 1105 N. Holliston Ave., Pasadena, Calif. 1926.

Sugden, Dr. John W., *1743 Yale Ave., Salt Lake City, Utah. 1936.*
Sumner, *E. L., 2537 Rose Walk, Berkeley, Calif. 1930.*
Sumner, E. L., *Jr.,* Box 188, Menlo Park, Calif. 1924.
Suthard, James G., 1881 Raymond Ave., Long Beach, Calif. 1938.
Sutton, Dr. George M., Fernow Hall, Cornell University, Ithaca, N. Y. 1924.
Swarth, Winifern Wood (Mrs. H. S.), 2800 Prince St., Berkeley, *Calif. 1941.*

T

Taber, F. Wallace, American Wildlife Institute, Investment Bldg., Washington, D. C. 1938.
Taber, Wendell, 3 Mercer Circle, Cambridge, Mass. *1935.*
Talmadge, Robert R., 1905 5th St., Eureka, Calif. 1939.
Tanner, Orey, 5019 Constance St., New Orleans, La. 1935.
Tanner, Prof. V. M., Brigham Young Univ., Provo, Utah. 1919.
Taverner, P. A., National Museum, Ottawa, Ont., Canada. 1909.
Taylor, Benjamin B. H., 11 Oak Drive, Orinda, Calif. 1941.
Taylor, Miss Grace M., 170 Vernon Terrace, Oakland, Calif. 1932.
Taylor, Dr. Lewis Walter, Poultry Division, Univ. Calif. Berkeley, Calif. 1931.
Taylor, Robert, 4033 Coolidge Ave., Oakland, Calif. 1930.
Taylor, Dr. Walter P., College Station, Texas. 1905.
Teachenor, Dix, 1020 W. 61st St., Kansas City, Missouri. 1922.
ter Pelkwyk, Joost, 1 Kanaalweg, Batavia, Java, Netherlands East Indies. 1941.
Terry, Mrs. Anne B., U. S. Veterans Hospital, Knoxville, Iowa. 1937.
Test, Dr. Frederick H., Dept. of Zoology, Univ. of Mich., Ann Arbor, Mich. 1936.
Test, Dr. Louis A., Rt. 1, Box 213, Lindsay, Calif. 1930.
Tevis, Lloyd P., Jr., Box 1416, Carmel, Calif. 1940.
Theobald, Miss Marion Jo, Rt. 1, Box 533, Palo Alto, Calif. 1939.
Thomas, Miss Evelyn H., 407 E. Pasadena, Apt. 1, Pomona, Calif. 1940.
Thomas, Capt. G. E., U.S.N., 3604 Curtis St., San Diego, Calif. 1940.
Thompson, George Levant, 2047 Stillman St., Selma, Calif. 1938.
Thompson, Mrs. Myrtle, 260 Orange St., San Bernardino, Calif. 1938.
Thomson, Miss Isabel A., 5939 Shafter Ave. ,Oakland, Calif. 1918.
Tidyman, Wayne, Opportunity, Wash. 1940.
Titus, Miss May, 2510 Bancroft Way, Berkeley, Calif. 1940.
Todd, W. E. Clyde, Carnegie Museum, Pittsburgh, Penn. 1909.
Tonkin, George, 1140 Park Square Bldg., Boston, Mass. 1920.
Towle, Robert Edgar, Malheur Migratory Waterfowl Refuge, Burns, Ore. 1936.
Trask, Parker D., U. S. *Geological Survey, Washington, D. C. 1934.*
Treganza, A. O., P. O. Box 97, Lemon Grove, San Diego Co., Calif. 1907.
Trelease, Thomas J., Steiner Apts. No. 5, Sparks, *Nevada. 1940.*
Trost, *Henry,* 475 29th St., San Francisco, Calif. 1924.
Troxell, Mrs. Inez Dorsey, 636 Coventry Road, Berkeley, Calif.
True, Gordon H., Jr., 262 Juanita Way, San Francisco, Calif. 1937.
Tucker, Mrs. Carll, Mt. Kisco, New York. 1927. (1931). [L.]
Tucker, *Nion R., 111 Sutter St., San Francisco, Calif. 1929.*
Turner, *Lovett Thomas, Soil Conservation Service, Caliente, Nevada. 1937.*
Tuttle, George Mott, Jr., Main St., Youngstown, N. Y. 1940.
Twining, Howard, 1189 Arch St., Berkeley, Calif. 1934.
Twisselman, William H., 415 Capitol St., Salinas, Calif. 1935.
Tyler, John G., Box 173, Fresno, Calif. 1905 (1920). [L.]
Tyler, Dr. Winsor M., 1482 Commonwealth Ave., Brighton, Mass. 1914.

U

Uhler, Francis Morey, Fish & Wildlife Service, Washington, D. C. 1928.
Unglish, W. E., 345 N. Rosanna St., Gilroy, Calif. 1910.

V

Vandervort, Charles C., Laceyville, Pa. 1937.
VanDeusen, Hobart Merritt, 8 Wellesley Road, Upper Montclair, N. J. 1940.
Van Fleet, Clark C., 6900 S. E. 28th Ave., Portland, Ore. 1941.
Van Rossem, Adriaan J., 2205 West Adams St., Los Angeles, Calif. 1909.
Van Tyne, Dr. Josselyn, Museum of Zoology, Ann Arbor, Mich. 1931.
Verges, Eugene M., 1126 Beacon St., Brookline, Mass. 1931.
Vignos, Miss Blanche, 520 S. Hobart Blvd., Los Angeles, Calif. 1926.
Vogt, Julian W., 1136 Edgemont St., San Diego, Calif. 1940.

Von Bloeker, Jack C., Jr., Allan Hancock Foundation, Univ. of S. Calif., Los Angeles, Calif. 1927.
Vorce, Kenneth Emory, Buena Park, Calif. 1937.
Vorhies, Prof. Chas. T., Univ. Arizona, Tucson, Ariz. 1916.
Vowels, William George, 1221 West 46th St., Los Angeles, Calif. 1940.

W

Walker, Alex, Route A, Box 267, Tillamook, Oregon. 1911.
Walker, Dr. Charles F., Stone Laboratory, Put-in-Bay, Ohio. 1942.
Walker, Ernest P., Apt. 103, 3016 Tilden St., Washington, D. C. 1910.
Walkinshaw, Lawrence Harvey, 1416 W. Michigan Ave., Battle Creek, Mich. 1934.
Wanzer, James Olin, 3601 56th St., Sacramento, Calif. 1922.
Warburton, Stanton, Jr., 3516 North 33rd St., Tacoma, Wash. 1917-19, 1938.
Warmer, Charles A., 412 W. 6th St., Los Angeles, Calif. 1920.
Watson, Frank G., 2418 Chestnut Ave., Long Beach, Calif. 1934.
Watters, Robinson C., P. O. Box 298, Cambridge, Md. 1938.
Watts, Leontine R. (Mrs. E. L.), 52 Eucalyptus Road, Berkeley, Calif. 1942.
Webb, William Griffin, 2563 Hill Drive, Eagle Rock Sta., Los Angeles, Calif. 1936.
Weber, Orlando F., Jr., Mt. Kisco, New York. 1936.
Webster, Jackson Dan, Rice Institute, Houston, Texas. 1942.
Weigel, Edwin Price, 709 Elmwood Ave., Wilmette, Ill. 1940.
Weiser, Charles S., 1901 East Market St., York, Pa. 1920.
Werner, Miss Selma, Hotel Carlton, 1075 Sutter St., San Francisco, Calif. 1925.
Wetherbee, Mrs. Kenneth, 11 Dallas St., Worcester, Mass. 1931.
Wetherill, Milton, Box 452, Farmington, New Mexico. 1934.
Wetmore, Dr. Alexander, U. S. National Museum, Washington, D. C. 1909 (1927). [L.]
Weydemeyer, Winton, Fortine, Montana. 1926.
Weyl, Edward S., 6506 Lincoln Drive, Mt. Airy, Philadelphia, Pa. 1929.
Wheeler, Mrs. Ruth, Angwin, Calif. 1939.
Whilton, Emery M., Hotel Tulare, Tulare, Calif. 1934.
White, Ed. F. G., 100 Powell Ave., Ottawa, Canada. 1930.
White, Francis B., Concord, N. H. 1926.
Widmann, Berthold, 4621 Wesley Ave., Los Angeles, Calif. 1923.
Willard, B. G., 51 Fresh Pond Parkway, Cambridge, Mass. 1910.
Willett, George, Los Angeles Museum, Exposition Park, Los Angeles, Calif. 1905.
Williams, Mrs. Edna Elden, Posey Star Route, Bakersfield, Calif. 1939.
Williams, John R., % The Texas Company, Box 1737, Shreveport, La. 1935.
Williams, Laidlaw O., P. O. Box 453, Carmel, Calif. 1925.
Wilson, Dr. Paul T., Marin Junior College, Kentfield, Calif. 1937.
Wilson, W. Warner, Box 128, Davis, Calif. 1929.
Wing, Dr. Leonard William, Dept. of Zoology, State College of Washington, Pullman, Wash. 1935.
Winson, J. W., Box 642, Sumas, Wash. 1925.
Woelz, Paul P., Quincy, Calif. 1941.
Wohnus, John Frederick, Univ. Calif. at Los Angeles, Los Angeles, Calif. 1939.
Wolfe, Major L. R., Hq. Repl. Center, Fort Warren, Wyo. 1921.
Wood, Dr. Sherwin F., Los Angeles City College, 855 N. Vermont Ave., Los Angeles, Calif. 1935.
Woodbury, Dr. Angus M., 248 University St., Salt Lake City, Utah. 1930.
Woods, Dr. Ralph A., 2468 W. Pico St., Los Angeles, Calif. 1931.
Woods, Robert S., Box 356, Azusa, Calif. 1920 (1927). [L.]
Work, Telford Hindley, 587 Alvarado Row, Stanford University, Calif. 1942.
Wright, Curtis, Maplewood Ranch, Calistoga, Calif. 1916 (1922). [L.]
Wright, Mrs. George Burwell, 2822 Piedmont Ave., Berkeley, Calif. 1939.
Wright, John Thomas, Rt. 5, Box 665, Tucson, Ariz. 1936.
Wright, Joseph S., P. O. Box 2423, Tucson, Ariz. 1942.
Wymore, Floyd H., 436 North Pine St., Ukiah, Calif. 1936.
Wythe, Miss Margaret W., Museum Vertebrate Zoology, Univ. Calif., Berkeley, Calif. 1912.

Y-Z

Yost, Mrs. Myrtle K., 2352 Las Colinas Ave., Los Angeles, Calif. 1923.
Young, James Boswell, 2516 Talbott Ave., Louisville, Ky. 1942.
Zahn, Otto J., 2115 Estrella Ave., Los Angeles, Calif. 1896.
Zech, Miss Lillian, 535 W. Highland Ave., Redlands, Calif. 1916.
Zerlang, Lawrence, 524 W. Hawthorne St., Eureka, Calif. 1918.

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